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EXPERIMENTAL STUDIES IN PSYCHOLOGY AND PEDAGOGY

EDITOR:
LIGHTNER WITMER
UNIVERSITY OF PENNSYLVANIA

V

A CLINICAL STUDY OF RETARDED CHILDREN

BY

JACOB DANIEL HEILMAN, PH. D.

PROFESSOR OF PSYCHOLOGY, STATE NORMAL SCHOOL,
GREELEY, COLO.

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A THESIS

SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL
OF THE UNIVERSITY OF PENNSYLVANIA IN PARTIAL
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THE DEGREE OF DOCTOR
OF PHILOSOPHY

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A CLINICAL STUDY OF ONE THOUSAND RETARDED CHILDREN IN THE PUBLIC SCHOOLS OF CAMDEN, NEW JERSEY.

INTRODUCTION.

It was found by means of a statistical investigation made at the close of the school year 1905-06, that there were more than two thousand retarded children in the public schools of the city of Camden. A year after the statistical investigation, an attempt was made to subject each one of the two thousand cases to an individual clinical examination. For causes which will be described in the main body of this thesis, it was possible, however, to re-examine only one-half of the original number of cases.

The motive for the clinical investigation is to be found in the failure of the public school to realize one of its ideals. This failure constitutes a just cause for the criticism that there is a deformation in the social institution for the education of our children. Deformation having been pointed out, this investigation was undertaken with the hope of reform by inquiring into the causes of the existing conditions. The object of this study is therefore twofold: first, to make a criticism of the public schools—to show in what respect they fail of reaching their aims; and secondly, to set forth some of the causes to which the schools' failure may be ascribed. The causes having been discovered, it is hoped that an effort to remove them will result in the improvement of the schools. As the second object constitutes almost the whole of this monograph, the first will be disposed of in the introduction.

Children begin their public school life at different ages, some as early as five, others not until eight or older. Even where education is compulsory, the age of entrance will frequently be above that prescribed by law. This is due in part to an evasion of the law and in part to ill health, and the influx of a foreign population. Nevertheless, the majority of children are under seven years of age when first entered upon the enrolment records of the public schools.

It is the aim of the school to have each child do the work of one grade in a single year, so that if a child enters the first grade at the age of six years, he should, if the school succeeds in its purpose, begin the work of the second grade at the age of seven years; of the third grade at the age of eight and so on through the grades. The school, however, does not succeed in realizing this ideal scheme of progress. A very cursory examination of school reports or enrolment records will reveal the fact that there is a large number of children in the public schools who must often have failed to make the necessary promotions.

From an analysis of the total enrolment figures of the Camden schools for 1905-06, it appears that about 3372 public school children or 26 1-3 per cent of the entire number were retarded, meaning by "retarded" those children of the first grade who were nine years old or more, of the second grade those who were ten or more and so on. A realization of the extent of the retardation of public school children led Mr. Bryan, the city superintendent, to study by means of a statistical inquiry, the conditions under which it existed, and also to consent to a clinical examination of the children whom his inquiry showed to be retarded. This examination was carried on by me during the second half of the school year 1906-07. Its object was to discover the social, educational, and other factors which delayed the normal progress of the child. What was accomplished in the effort to realize this object, will be set forth in the main body of this monograph.

In order to facilitate the investigation and to secure data that were relatively uniform and of scientific value, the first task was the preparation of a suitable blank. The description and analysis of this blank will constitute the subject matter of the first chapter. Other steps preliminary to the investigation and certain miscellaneous problems connected with it, like the withdrawal of children from school, will be considered in the second chapter. The third chapter will be a treatment of the results of the clinical investigation.

CHAPTER I.

Description and Analysis of the Blank.

The analysis of the blank is made because it is indispensable to a proper comprehension of the chapter on results. It is hoped, moreover, that it may prove of service to others who may contemplate the preparation of a blank for similar investigation. The blank is of such a character that it may also serve as a model to teachers who are persuaded of the utility of keeping a permanent record of each child. Such a record, revised each year and sent with the child as it is promoted or transferred from one school to another, would more than repay the teacher for the time devoted to making the records. To do this work properly, presupposes on the part of the teacher, a knowledge of the individual child which is really indispensable to its proper discipline and instruction—a knowledge, however, which many teachers lack. The required use of this blank will go far towards compelling the teacher to gain this necessary knowledge. A case presents itself to my mind which forcibly illustrates how children may be made to suffer on account of the ignorance of the teacher. This was a girl, nine years old and in the first grade. She did very poor work and had little promise of being promoted. The mother was very urgent in demanding that her child should be promoted at the close of the term. Partly owing to the parent's insistence and partly in consequence of a school regulation, this poor child, who was a microcephalic imbecile, was detained an hour or more almost every day after the regular school session in order that she might study her lessons. On further inquiry, I discovered that no matter how much time the child devoted to her lessons, she learned nothing.

The keeping of such a record would do more than benefit the teacher and the pupil. Properly made and preserved, these records would constitute a repository of data, upon which to build generalizations of the utmost significance to the school system and all connected with it, whether in the capacity of patron or pupil, teacher or supervisor.

All the items of the blank, which is reproduced in actual size on the following page, may be classified somewhat roughly into three groups: one group pertains to the child in the home,

No. Name

Grade Class 190 Address

Grade Class 190 Address

School 190 Teacher

School 190 Teacher

Progress E G F D vD Date of birth Age

Conduct E G F D vD Age on entering school No. years in school

Attendance vR R I vI A School history (Rel)

Most deficient in

Best in

Habits

		5 4 3 2 1		5 4 3 2 1
Father living dead	Normal	vG G M Sl D	Deficient	Bkw IH IM II Id
Mother living dead	Health	vG G F P vP	Home Care	vG G F P vP
Step-father, Step-mother	Nutrition	F G M P St	" Culture	vG G F P vP
Nationality F.	Support	R W M P vP	" Discipline	vG G F P vP
" M.	Occupation of provider			
Birthplace	Child works at			
Lives with		Anormality		Asymmetry
Home Lang.	Trunk			
Older brothers living dead	Arms			
" sisters " "	Legs			
Younger brothers " "	Hands			
" sisters " "	Feet			
Eye, R.	Cranium			
Eye, L.	Forehead			
Defects	Face			
Disease	Ears			
Ear, R.	Eyes			
Ear, L.	Nose			
Defects	Lips			
Disease	Palate			
Co-ordination 5 4 3 2 1	Tonsils			
vB Bold Norm Shy vS	Naso-ph'nx			
Am Resp Pass Sull Sur	Mth Breathg			
Sto In Al Nerv vN	Teeth			
vR Refl Norm Imp vI	Tongue			
Stu Wilf Firm Flex Vac	Voice			
Stammer (inf) 5 4 3 2 1	Speech			
Stutter 5 4 3 2 1	Diseases			

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another to the child in the school, and the third to the child as a mental and physical entity. Just as there are three main groups of facts, so there are three main sources from which to gain our information: the home, the teacher and the child himself. When large numbers of children are to be examined within a limited period, it is impossible to undertake to see the parents of every child and the necessary information must be obtained from other sources. Frequently the child's teacher will have some knowledge of the home conditions. In my experience, however, the principal is more likely to know the home, especially if she has held her position long enough to become acquainted with the district. It is also a practical expedient to use the child's appearance as an index of the home conditions. In my work, I attempted to obtain facts about the home from the teacher, principal and child.

The blank makes no provision for obtaining certain data of value, such, for example, as the circumstances of the child's birth. A number of considerations entered into the determination of the number and kind of data, for the collection of which provision was made. To prepare a blank four times the size of this one would have been a comparatively easy task. Our blank limits the data to those considered most essential for an understanding of the child's status in the school, *i. e.* his backwardness in grade for his years. The blank must be as convenient as possible to handle and must be filled out with the least possible expenditure of time. Not an item appears on this blank without having had its purpose and relative value subjected to critical scrutiny. In certain cases, however, important facts may come to light which ought not to be passed by; these should be carefully entered on the back of the blank. The blank was only put into its present form after several days' trial. This resulted in a few alterations, but for the most part it was left as originally conceived by Professor Witmer.

There are a number of preliminary data at the head of the blank which may usually be obtained from the ordinary school records. These are *name, address, grade, class, school, teacher, date of birth*, and *age*; sometimes even *age on entering school* and *number of years in school* can be obtained from the records. In the Camden schools it was possible to obtain all but the two last named items from the regular registration books. It will be noticed that *grade, class, school, address*, and *teacher* are duplicated. This is explained in the following way. When I began my work

I examined the blanks Mr. Bryan had used in his inquiry during the year 1905-06. From these records I obtained the name, grade, class, address and teacher for *each* one of the two thousand retarded children. These facts are required to identify and locate the child, therefore I entered them upon my blank before beginning the actual examination. But when I began the examinations, I found that the location of the child had changed in a large percentage of cases, due to promotion, transfer or change of residence; hence the duplication. If the facts which serve to identify and locate the child are obtained from the school records for the year in which the investigation is carried on, some of the items on the blank need not be duplicated, but this does not apply to grade and class. The grade and class of the year previous to that of the examination should be entered for every child upon the blank, so that when a child's progress is reported by the teacher as good, the investigator can at once compare this judgment with the number of classes or grades the child made during the previous year. Frequently teachers will report progress "good" simply because the child in question is then doing well. They do not take into consideration the length of time involved. When their attention is called to the fact that the child made no promotion during the previous year, they frequently reverse their judgment.

After we have obtained the *name, grade, class, school, address,* and *teacher* of the child, he may be said to be located. We now know where to go to find him, whether at school or at home, in order to obtain the other data called for by the blank. Moreover, *age, grade,* and *class* give the child's intellectual status, enabling us to measure the extent of his retardation. *Date of birth* and *age* are both called for, in order that one may serve as a check upon the other. If there is any inconsistency, the information must be regarded as unreliable. The same may be said about *age on entering school* and *number of years in school.*

Closely associated with all the data mentioned above are *progress, conduct,* and *attendance.* After *progress* appear the letters E, G, F, D and vD; these are abbreviations for the words *excellent, good, fair, deficient* and *very deficient.* The letters used in connection with *conduct* are the same as those used with *progress,* and stand for the same words. The letters following *attendance* are vR, R, I, vI, and A; they are symbols for the words *very regular, regular, irregular, very irregular,* and *absent.* These letters, standing for words, are used because they are likely to mean more to the person doing the grading, than mere figures standing for so many grades. However, figures may be employed. In connection with *normal,* which for the sake of compactness is used for normal mentality, both figures and letters appear. The same arrangement is employed in connection with *deficient,* standing for deficient mentality. To indicate the grades of *co-ordination, stammer,* and *stutter,* only figures are employed, because no significant words suggest themselves. Below the item *co-ordination* are five groups of letters and words which are used to grade five different mental or moral qualities, whose purpose will be considered later. The other qualities which it was thought profitable to grade are *health, nutrition, support, home care, home culture,* and *home discipline.*

I have now made mention of all the data involving the gradation of qualities, conditions and functions; I shall next consider the system of grading. It will be noticed that a five-point system is adhered to throughout, and there are some reasons why a five point, rather than a four or six point, or some other system, should have been chosen. It appears to be the most natural system. In our every-day judgments we are apt to classify with respect to a system of five grades. When asked to grade the mentality of a child, it does not seem difficult to say that he is either good or poor, or neither. But we constantly meet with exceptional cases which we feel should be classed as very good or very poor, and therefore one more grade appears necessary at each end of the three already given. In asking teachers to grade the mentality of their pupils, I frequently asked them whether the mentality was good or poor, without telling them how many grades of mentality I used. In very many cases they responded, "neither," meaning medium, or, "He is very good," or, "He is very poor."

Another reason for preferring the five-point system is its easy adaptation to other systems. In translating this system into the percentile system, or the reverse, the lowest grade would include all the points from 1-20 per cent; the second from 21-40; the third from 41-60; the fourth from 61-80; and the fifth from 81-100. Although somewhat imperfectly, it may be articulated with a three-point system by combining the two points at each extremity of the five-point system. Again, some four-point systems are simply five-point systems in disguise. Such, for example, is the one used in the college of the University of Pennsylvania. Here the symbols D, G, P, and N, stand for the words *distinguished, good, passed,* and *not passed,* respectively. The group marked

N has really not been analyzed and graded because the college has no interest in grading students who fall below the passing mark; but if the N group were graded according to relative ability, it would be found that the students in it would distribute themselves into two groups which would be related to each other like the D and G groups.

In connection with normal mentality, for which *normal* appears on the blank, I wish to explain in what way the figures are used to indicate gradation. Directly after *normal* are placed the symbols vG, G, M, Sl and D, standing for the words *very good, good, medium, slow,* and *dull.* Where such words or their symbols are used there can be no doubt as to the grade for which they stand, but this is different where figures are employed. Here it will be observed that D is placed below the figure 1; therefore the figure 1 indicates the lowest grade of normal mentality. The highest grade of mentality is indicated by the figure 5, placed above vG; and medium mentality by the figure 3 above M. Consequently, the higher the figure, the higher is the grade of mentality which it denotes. This use of the highest figure for the highest, and the lowest figure for the lowest degree of the quality after which it appears, is followed wherever figures are used for grading. In general, this is contrary to custom, but it is adhered to in this blank for the sake of being consistent with the percentile system of marking grades. Just as in the percentile system, so in this system the lower numbers stand for the lower grades.

After this general treatment of the graded items, I wish to consider these items individually, and first *mentality.* The immediate purpose of the preparation and employment of this blank was the collection of data for an investigation of the causes of retardation. Much of the retardation may be accounted for by a low degree of mentality; and to determine the number whose mental capacity is low, gradation was not avoidable. The grades of normal mentality appear on the blank after the word *normal.* The symbols employed are vG, G, M, Sl, and D, and they stand for the words *very good, good, medium, slow,* and *dull.* These words were not used to grade the class standing of the children, but their mental capacity or ability. The use of the words *very good, good,* and *medium* for grades 5, 4, and 3, will be accepted without comment. It may seem that perhaps we should have chosen the words *poor,* and *very poor* for grades 2 and 1 respectively. These words indeed are often applied, but the endeavor was made to use on the blank, words which would appeal most to the natural judgments of the teacher. It was thought that many teachers speak of their children as being "slow" and that this means more as a grading of mental capacity than the term *poor.* A "dull" child the teacher also understands readily, and this seemed to be a more striking term for children who are in the lowest grade of normal mentality than the rather indefinite term *very poor.* Whatever catchwords may be employed, they serve only to assist the investigator to assign the child his proper position in one of the five grades represented by 5, 4, 3, 2 and 1.

It is commonly assumed that all children in the public schools are of normal mentality. If this were true, it would be possible to distribute all our cases over the five grades of normal mentality which have just been discussed. However, it does not take a very extensive investigation of the mental capacity of children who are retarded in school progress to discover that many of them are subnormal in mental capacity. Indeed, for every thousand children examined we find one or more children who are properly cases for an institution for feebleminded children. We must provide for a large number of children to be distributed over classes or grades that are recognizably deficient in mentality. To preserve the five-point system, children who are discovered to be mentally deficient are distributed over five grades. The highest grade of these deficient children is called *backward;* the lowest grade would be the *idiot.* The middle grade is occupied by what is generally characterized as an *imbecile of medium grade.* Between him and the backward child we place the *imbecile of high grade.* Between him and the idiot we place the *idio-imbecile.* In this scheme of classification we omit the imbecile of low grade, whom we should classify either as an imbecile of medium grade or as an idio-imbecile; and we fail to recognize more than one grade of idiot. The mentally deficient are therefore represented on the blank by grades 5, 4, 3, 2, and 1, for which the following symbols are employed, Bkw, IH, IM, II, and Id.

A different point of view might have given rise to a different system of classification. Thus, Ireland and Shuttleworth both make use of a pathological classification. This must necessarily be as incomplete as is our knowledge of the pathological conditions of the feebleminded. It is undoubtedly of value, however, to the physician, for he looks to the pathology of the idiot to throw light upon its etiology, diagnosis, and prognosis. But these pathological conditions are usually not the causes of idiocy, but mere concomitants. The essential fact of idiocy is mental deficiency. In the *British Medical Journal* for 1902 Dr. Eichholz says: "Feeblemindedness or mental deficiency is not so much a symptomatic condition to which a medical man can apply his art with hope of success, as a social and educational grouping which has gradually arisen in connection with the development of elementary education in this and other countries." Moreover, it is recognized that the hope for the greatest improvement of the feebleminded lies in their instruction and training,—that the problem is an educational problem, and not a medical one. Even the physician becomes a trainer when he undertakes the daily care of the feebleminded child. This has been recognized from the time of Itard through Seguin to Sollier and Barr. In *Die Kinderfehler,* Vol. VII, p. 97, J. Trüper quotes the following passage by Dr. Pelman, the psychiatrist at Bonn, from the introduction to the German edition of Sollier's, "Psychologie de l'idiot et de l'imbecile": "What we meet as the pathological foundation of idiocy are the sequelæ of diseased processes that have long since run their course. These one can no longer obviate through any known medical art. The feeblemindedness which has its basis in a congenital brain disease, or in one acquired in the first years of life, is no longer susceptible of cure. The task of the physician can therefore receive but a small reward."

It appears to be generally admitted that the most satisfactory classification of the feebleminded is psychological or educational. A psychological classification, however, does not appear to me as practical as an educational one. Even so fundamental a psychical process as the attention, upon which Sollier bases his psychological classification, is not such a measure of general capacity as to be of much service in determining the place of these children in schools and institutions. Of all the schemes of classification which have been offered, the most practical, in my judgment, is that of Dr. Martin W. Barr. It is based upon educability. Omitting the moral imbecile, it is as follows: I. ASYLUM CARE: 1. *Idiot,* (a) Profound, unimprovable; (b) Superficial, improvable in self help only. 2. *Idio-imbecile,* improvable in self help and helpfulness. II. LONG APPRENTICESHIP AND COLONY LIFE UNDER PROTECTION: *Imbecile,* (a)Low grade, trainable in industrial and simplest manual occupations; (b) Middle grade, trainable in manual arts and simplest mental requirements; (c) High grade, trainable in manual and intellectual arts. III. TRAINED FOR A PLACE IN THE WORLD: *Backward or mentally feeble,* mental processes normal but slow and requiring special training and environment to prevent deterioration.

The five grades of mental deficiency that are used on the blank are practically the same as those which have been presented by Dr. Barr. The three highest grades of the mentally deficient are in complete agreement. The low grade imbecile, however, is not given a separate classification on the blank, nor is the class of idiots subdivided into the profound and the superficial.

To assist in the further presentation of the items of this blank, I have reproduced an actual blank partially filled out, which will be found on the next page.

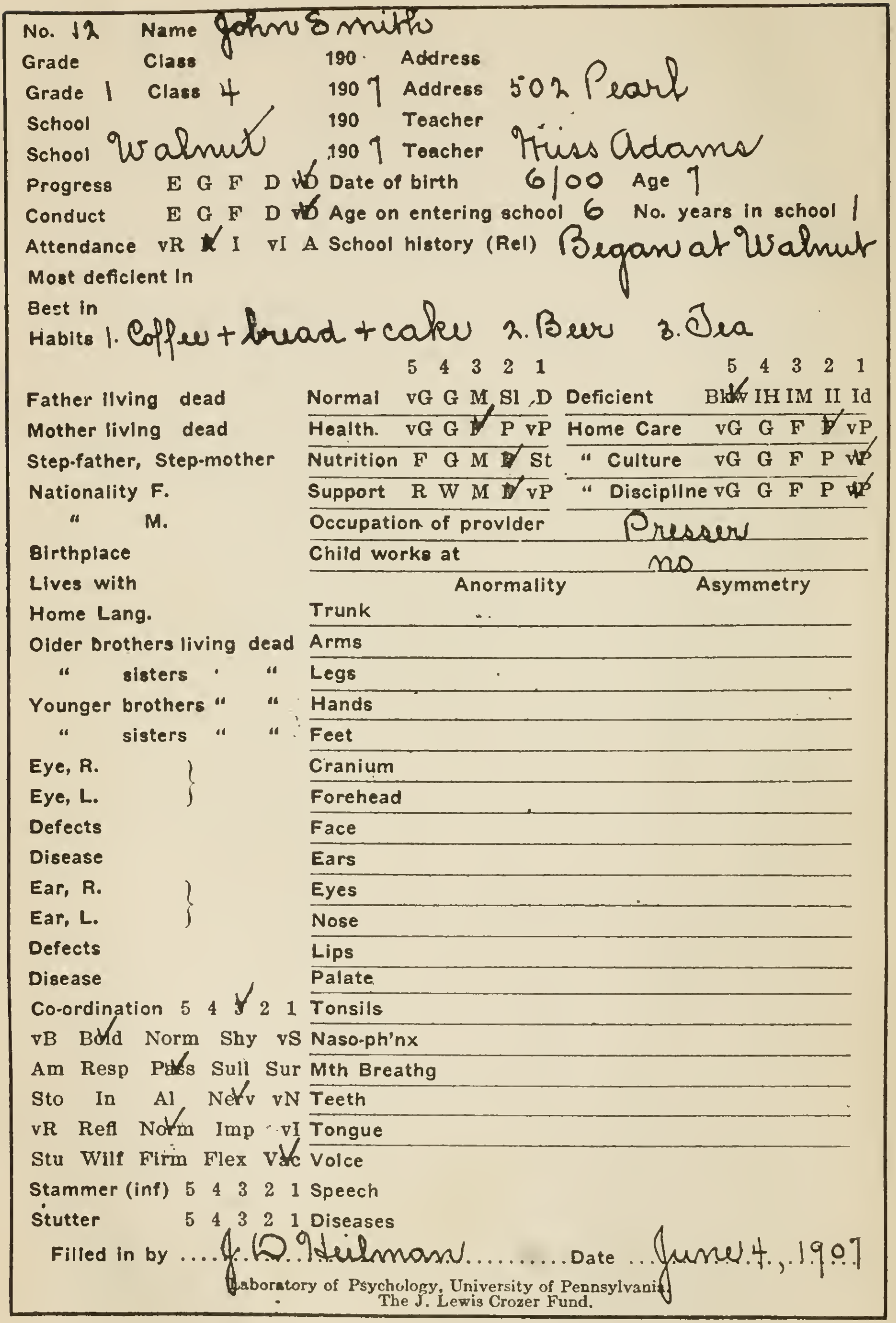
At the top of the blank is the name of the child, in this case an assumed one. On the same line with this, is a space provided for the purpose, is the number 12. This number indicates the order of the blank in a series. The serial classification of the cards will be determined by convenience. In my investigation, the cards of the boys and girls were placed in separate series for each school.

The significance of the items which give the child's residence and serve to locate him in a particular class and school and under a particular teacher in the year when the examination was made, needs no explanation. If these items are not sufficiently intelligible from an examination of the reproduced blank on the next page, a satisfactory explanation will be found in the preceding article.

Directly below the recorded data locating the child, are found the data which indicate why this child has attracted special attention.

Progress and *conduct* are followed by E, G, F, D, and vD, the initial letters for *excellent, good, fair, deficient,* and *very deficient.* Gradation of progress should be made from the standpoint of the rapidity with which the child passes through the grades. Many teachers feel inclined to call a child's progress good because it does well in its grade, regardless of the fact that the work has been repeated one or more times. The grade and class of the previous year will enable the investigator to see how often or how much of the work was repeated. Progress should be marked with reference to the rapidity with which the child passes through the grades, without regard to his attendance.

If a retarded child's progress be good at the time of the examination, then special effort should be made to find the cause of retardation in his past school life. A space is provided for a brief synopsis of the "school history."



No. 12 Name John Smith
Grade Class 190 Address
Grade 1 Class 4 1907 Address 502 Pearl
School 190 Teacher
School Walnut 1907 Teacher Miss Adams
Progress E G F D [✓ vD] Date of birth 6/00 Age 7
Conduct E G F D [✓ vD] Age on entering school 6 No. years in school 1
Attendance vR [✓ R] I vI A School history (Rel) Began at Walnut
Most deficient in
Best in
Habits 1. Coffee + bread + cake 2. Beer 3. Tea

		5 4 3 2 1		5 4 3 2 1
Father living dead	Normal	vG G [✓ M] Sl D	Deficient	[✓ Bkw] IH IM II Id
Mother living dead	Health.	vG G [✓ F] P vP	Home Care	vG G F [✓ P] vP
Step-father, Step-mother	Nutrition	F G M [✓ P] St	" Culture	vG G F P [✓ vP]
Nationality F.	Support	R W M [✓ P] vP	" Discipline	vG G F P [✓ vP]
" M.	Occupation of provider	Presser		
Birthplace	Child works at	no		
Lives with		Anormality		Asymmetry
Home Lang.	Trunk			
Older brothers living dead	Arms			
" sisters " "	Legs			
Younger brothers " "	Hands			
" sisters " "	Feet			
Eye, R. }	Cranium			
Eye, L. }	Forehead			
Defects	Face			
Disease	Ears			
Ear, R. }	Eyes			
Ear, L. }	Nose			
Defects	Lips			
Disease	Palate			
Co-ordination 5 4 [✓ 3] 2 1	Tonsils			
vB [✓ Bold] Norm Shy vS	Naso-ph'nx			
Am Resp [✓ Pass] Sull Sur	Mth Breathg			
Sto In Al [✓ Nerv] vN	Teeth			
vR Refl [✓ Norm] Imp vI	Tongue			
Stu Wilf Firm Flex [✓ Vac]	Voice			
Stammer (inf) 5 4 3 2 1	Speech			
Stutter 5 4 3 2 1	Diseases			

Filled in by J. D. Heilman Date June 4, 1907

Laboratory of Psychology, University of Pennsylvania.
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As a basis for rating conduct, I chose the agreement between the child's actions and school regulations. In addition to interfering with a child's progress, poor conduct may have a diagnostic value of its own. For example, deficient conduct may be a consequence of low mental capacity. When a child is unable to take part in school exercises, his conduct is invariably of such a nature as to conflict with the order of the school. Deficient conduct may be indicative of defective home discipline. When conduct is very deficient at school, delinquency is often associated with it. When conduct was reported deficient, I always inquired into the child's moral history, and often obtained a story of thefts, gambling and sexual indecency. I recall at least two cases of horse stealing, quite a number of gambling and no less than six who had been guilty of sexual offences. I do not for an instant believe that the teachers knew of most of the cases, or that they reported all the cases which they did know. Care should be taken not to mark as deficient the conduct of a restless child, who may simply be unable to control his body on account of ill-health.

The symbols vR, R, I, vI and A are used to record *attendance*. These symbols are the initial letters of *very regular, regular, irregular, very irregular,* and *absent.* The choice of the words used in connection with this item, as with all the other items, resulted from an attempt to employ words which were already used by the school for the same purpose, or which would assist the investigator and teacher in making the rating. If the five point system of grading be strictly followed, a child who is present from 17 to 20 days in a month will be considered very regular; from 13 to 16 regular; 9 to 12 irregular; 5 to 8 very irregular, and 1 to 4 absent. As truancy is closely related to attendance, this fact should always be investigated in connection with it, and recorded on the back of the blank. On the face of the blank no space was allowed for truancy and a number of other important facts, because they are of relatively infrequent occurrence, and a note on the back of the blank involves very little time and effort.

The card of John Smith, reproduced on page 16, records his progress and conduct as very deficient; attendance, however, is regular. He entered school at six years of age, and at the time when this blank was filled out, June 4, 1907, which may be seen from the bottom of the card, he had been in school one year and was at that time seven years of age. His school history shows that the work of the year was done in the school in which he was found at the end of the year.

We therefore see that we have a record of deficient progress which is not explained by irregularity of attendance, nor by entering school late, and which is either associated with or caused by deficient conduct. When next we look at the grading of mentality, we find that he has been placed in the group of those having deficient mentality and that he is classed as a backward child.

The ratings of progress, conduct, attendance and mentality, which have been considered, are indicated by a check mark over the symbol of the reported grade of the respective quality. This is an easy symbol to make, and the saving of time is an important desideratum. If I dissented from the teacher's judgment with respect to any item of the blank after having examined the child, I noted the fact by drawing a horizontal line through the symbol of the grade in which I placed him. Thus, if I had considered this boy a high grade imbecile, the blank, in addition to the check mark through Bkw, would have had a horizontal line through IH. The marks employed are immaterial, but it is important that they should be made as quickly as possible and should be easily distinguished in the subsequent collation of the data of the blanks.

We now see that we have to do with a backward child of normal age in the first school year, who has been regular in attendance throughout the year, but whose conduct is reported as very deficient. Is his backwardness the consequence of deficiency of conduct? Is it the result of school conditions? Has it followed upon the home environment? Or is it based upon structural defects, or inheritance?

Directly below the entry of the child's mental grade is found a group of items relating to the child's environment. His health is reported as *fair,* nutrition *poor,* support *poor,* home care *poor,* home culture *very poor,* and home discipline *very poor.* There can be very little doubt that the progress of a child in school, independent of any physiological backwardness, is the result of these various factors. Even physiological backwardness may be augumented, and probably caused, by the associated activity of a number of unfavorable environmental conditions. The extent to which these factors are associated with different degrees of mentality as revealed through school work, is one of the subjects of my investigation.

In employing this blank the general health of the child is to be recorded as *very good, good, fair, poor,* or *very poor.* The record is based upon such judgment as a teacher or parent would give. It is not a report such as a medical examiner would make. The object is to find to what extent the child's health interfered with his attendance at school or with his performing daily tasks, even if he were in actual attendance. It does not propose to record the existence of actual disease. If the child is found to be suffering from some special disease, this is to be reported in the space provided at the bottom of the blank after the word *diseases*. Here also are to be recorded such children's diseases as the child may have suffered from in the past. When facts worthy of special note are discovered in this connection, they are to be recorded on the back of the blank.

Poor health may not only cause prolonged or repeated absences, and so indirectly retard the child: it often interferes with vigorous mental action, and is a predisposing cause of fatigue. When fatigue is readily produced, sustained attention, which is so essential for mental acquisition, becomes practically impossible. Many physical ailments are a continual source of irritation to the nervous system, not only because they produce a condition of *malaise*, but because they withdraw attention from the lesson to the source of excitation. The connection between good health and the attainment of the objects of school instruction is so close that school systems are awakening to the need of physical directors and medical inspectors to look after the physical welfare of the children. Mental, and often moral, deterioration may result from prolonged ill-health.

The nutrition of the child is also to be recorded on the basis of general observation, rather than a physician's examination. The five classes, in one of which the child's nutrition may be recorded, are indicated by the letters F, G, M, P, and St, which stand for the words *fat*, *good*, *medium*, *poor*, and *starved*, respectively. Faulty nutrition retards the child's progress, whether it is due to disease or to improper and insufficient diet. If no positive knowledge of the diet can be obtained, the rating of nutrition may be based upon certain signs to be observed in the child. After the item *habits*, in the blank, I usually recorded such facts as I could obtain concerning the child's diet. Thus, John Smith's nutrition is recorded as poor, and after the word *habits* occurs the formula, "1. Coffee + bread & cake; 2. Beer, 3. Tea." This means that the child's usual breakfast is coffee, bread and cake; that he drinks beer at dinner and tea at supper. In this case it would appear that the poor nutrition was probably due to insufficient and improper diet. This condition is one which I have found in a very large number of the backward children whom I have examined.

The child's color may be employed to assist in determining his nutritional status, for paleness is an effect of either an insufficient supply or an impoverished state of the blood, due to a lack of oxygen or the proper kind and amount of food materials; but lack of color must not be mistaken for a light complexion as shown by the color of the eyes and hair, nor must a dark complexion be interpreted as an absence of paleness.

Paleness may be due to a blood disease called anæmia, and when this is the case, the skin will remain permanently pale without change of color. The color of the lips, and changes of color in the finger nails when subjected to pressure, may also be observed. If this change of color upon pressure is not very decided, it may be taken as a sign of poor nutrition. If the return of color upon removal of the pressure is slow in appearing, it indicates vaso-motor disturbance.

Other important signs of poor nutrition are emaciation, and deficient weight in comparison with height. Disproportion among the several members of the body may indicate defective nutrition at some period previous to the time of examination. Signs of defective nutrition during the early period of rapid development previous to the second year, may be observed in teeth, ears and in other developmental defects. These, however, are not to be taken into account in this connection, excepting in a general way. They will be entered under *anormalities* and *asymmetries* of the bodily members.

If the financial support of the child in the home is poor, it is likely that poor nutrition is the result of insufficient diet. If the support is ample, poor nutrition is more likely to be due to physiological conditions, and to be associated with ill-health. The support which the child receives at home is entered as *rich, well-to-do, medium, poor,* or *very poor.* The financial condition of the family not only militates against the child's health and nutrition, and so causes retardation: it becomes a direct cause of retardation owing to the fact that many children are kept from school to assist in eking out a livelihood for the family. Many children in Camden leave school about the middle of May to engage in some kind of occupation. This is especially true of the Italian children, who leave school about a month and a half before the close of the term to obtain employment as berry-pickers.

Moreover, in my investigation there appeared to be some families so afflicted with ill-health and poverty that they would have to depend upon charity for their subsistence if they sent their children regularly to school. Poverty becomes a direct cause of retardation when it is so extreme as to prevent the family from supplying proper and sufficient food, clothing and housing. The nurture of thousands of children in our large cities is the direct cause of adult inefficiency.

Home care, home culture, and home discipline are usually directly correlated with the financial status of the family, though there are many exceptions to this rule. Home care is rated as *very good, good, fair, poor,* or *very poor.* The cleanliness of the child's person and clothing is the best indication of home care. The vitiated air in which many of our teachers and children are immersed day after day, has its origin not only in the poisonous products of the breath, but also in the children's clothing, which is often soaked with filth. It would surprise any investigator to learn how many parents adopt the convenient custom of "sewing up" their children for the winter. As the cold weather increases, the number of garments increases, and as the weather moderates the garments diminish. During this entire period the clothing worn next the skin is unchanged, and may be neither washed nor aired for months. This filthy condition not only militates against the child's well-being, but interferes with his progress in school, because these children are repulsive to most teachers.

Insufficient clothing makes it difficult for many children to maintain health and keep in daily attendance. I was informed by the principal of one of the Camden schools that there had been a marked improvement in attendance upon supplying the poorest children with the cast-off clothing of those in more fortunate circumstances.

The overcrowding of a family into one or two rooms, the result of insufficient financial support, is also a frequent factor in reducing home care and home discipline to a minimum.

By home culture is meant the degree of mental development and refinement attained by the family. If the child has an intellectual, moral, and emotional environment of high grade, his school progress is favored by it. The conception of culture is not very definite, nor is it easy to estimate the different grades of home culture. I asked the teachers to base their judgments on the kind of literature read in the home, on the parents' occupation, and the content and modes of conversation. In the determination of the culture level, as well as of other facts about the home, the child himself very often serves as a satisfactory index.

The relation of home culture to school progress is not to be settled off-hand without a careful inquiry. Children from the homes of very ignorant parents often stand high in their school work, but intellectual standing is not the whole of culture. Where the moral element is prominent, the members of a family live a life of duty and self-restraint and effort, whether at home or in school. This, of course, means application and discipline that develop habits of work and attention so necessary for school progress. Lack of moral training in the sense of absence of proper home discipline is a frequent cause of lack of industry, application, and concentration of attention. I consider the item of home discipline one of the most important determining factors of school progress. A well disciplined child will always be amenable to the directions of his teacher and the regulations of the school. On the other hand, a child may manifest good moral conduct, may give no trouble in school, and yet may lack the essentials of discipline. In explanation of the deficient progress of John Smith, I consider the rating of home discipline, *very poor,* as significant. In his case, it also resulted in deficient conduct.

We now know something of this boy's environment. He is the offspring of parents who are living in poverty (his father is a presser, a tailor's assistant), unable to supply his body with sufficient food, though not requiring him to work as yet, unintelligent enough to furnish him with beer, tea and coffee, unwilling or unable to accord him satisfactory care of body and clothing, low in the scale of culture, and incapable of supplying the mental and moral discipline, the lack of which is probably evidenced in his retarded progress and deficient conduct.

In the lower left-hand corner of the blank are a number of items of great interest in determining the general physical aptitude of the boy, as well as certain traits of character which stand in close correlation to the manifestation of intelligence. Does the boy show good motorial *co-ordination?* The check mark stands over the number 3, which gives his co-ordination a rating of *medium.* We learn little from this that throws light on the association of motor with intellectual deficiency, but from a large number of cases we may see whether boys deficient in intelligence more often manifest good co-ordination, poor co-ordination, or medium.

It is impossible to give in this place an extended discussion of the factor of co-ordination. A few words in regard to it will have to suffice. Co-ordination may be defined as the ability to accomplish by means of muscular contractions and with the least possible expenditure of energy, a definite purpose or assigned task. It means more than the simultaneous or successive synergy of two or more muscles or groups of muscles. It requires a delicate adjustment of the muscular innervation necessary to move a member of the body at a given rate through a given distance. There is reason to believe that control of this muscular innervation is dependent upon the will, and that volitional activity is closely associated with mentality.

Several criteria may be employed to pass judgment upon the degree of co-ordination. One is the accuracy with which the task is accomplished. Thus, if a child be asked to move his arm a given distance in a given direction, his co-ordination may be regarded as good if his movement corresponds very exactly to the one required. Judgment of the degree of co-ordination may also be based upon the facility displayed in the accomplishment of an assigned task. In my investigation I employed the following method to rate co-ordination: I threw a number of pegs, about two inches long and one-eighth of an inch in diameter, upon the table and asked the child to pick them up as rapidly as possible, using for the purpose but one hand and holding the pegs in the same hand while he continued to pick them up.

Below the word co-ordination are five groups of symbols and words descriptive of mental and emotional character. Their appearance on the blank was to some extent in the nature of an after-thought. It was not my purpose to determine whether the child was shy or bold, amiable or sullen, stolid or nervous, reflective or impulsive, stubborn or vacillating in will; but it became apparent that shy children are often misjudged. They are apt to be under-rated in intelligence and bold children over-rated. Shy and timid children will not do so well in their recitations as the bold and forward. Some children approximating the condition of moral imbecility are extremely forward and bold, and give the appearance of great intelligence, and are therefore apt to be rated high. Teachers are apt to underestimate the capacities of a sullen or surly child, and give too favorable a rating to an amiable one. The child whose thought is characterized by reflection is oftentimes under-rated in comparison with the impulsive child. Moreover, many of these characters have a diagnostic value. Shyness is often associated with deafness, for the semi-deaf child often knows that something is required of him, the exact nature of which he is unable to comprehend. Sullenness is associated with adenoids, as is also stolidity. Nervousness and impulsiveness and vacillating will are symptomatic of impoverished nervous systems. It is also true that these characters exercise a facilitating or retarding effect upon school progress and general mental development. The shy child is not likely to get so much out of the school work as the bold child. The amiable child receives more attention from its teacher than the sullen or surly child. The child who is alert in mentality is more apt to profit by the school environment than one who is stolid or nervous. The child whose will is firm, will do better work than one whose vacillating will produces want of application, or one in whom wilfulness or stubbornness awakens antagonism and negativism.

The choice of words with which to describe mental and emotional character is not an easy one. The words that have been selected for this purpose were chosen after careful consideration. It is possible that different words may recommend themselves to others as being more suitable. The words selected were picked out primarily because they were thought to give an adequate description of a mental character, that is, for the purpose of providing an exact psychological designation, but also to furnish terms familiar to the everyday judgment of the teacher. The terms describe the following five traits of character:—

(1) Social reaction:—boldness or shyness.

(2) Feeling and its expression:—amiability, responsiveness, sullenness or surliness.

(3) General mental and physical activity:—stolidity, inertness, alertness, or nervousness.

(4) Intellectual character:—reflectivity or impulsiveness.

(5) Will or volitional character:—stubbornness, wilfulness, firmness, flexibility, or vacillation.

I give below various words that may be employed to describe each of the five groups used in connection with each of these five traits of character. The one which is employed upon the blank stands at the top in each case, printed in italics.

Social reaction:

very bold	*bold*	*normal*	*shy*	*very shy*
insolent	courageous	indifferent	reserved	afraid
impudent	forward	unconcerned	coy	cowardly
impertinent	pert		timid	
	saucy		bashful	
			diffident	

Expression of feeling:

amiable	*responsive*	*passive*	*sullen*	*surly*
sweet	impressionable	indifferent	sulky	rude
genial	sympathetic	apathetic	cross	gruff
gentle		phlegmatic	peevish	
			morose	

General activity:

stolid	*inert*	*alert*	*nervous*	*very nervous*
apathetic	inactive	active	eager	excitable
impassive	sluggish	bright	restless	
wooden				

Intellectual character:

very reflective	*reflective*	*Normal*	*impulsive*	*very impulsive*
meditative	thoughtful	indifferent	thoughtless	rash
	cautious			

Will:

stubborn	*wilful*	*firm*	*flexible*	*vacillating*
intractable	determined	normal	submissive	wavering
obstinate	headstrong		yielding	unstable
obdurate	refractory		pliant	
unyielding				

It will be seen from the above that the child's social reactions are distinguished as presenting opposite characters of boldness and shyness. Children who present neither character in marked degree are called *normal.* Perhaps it would have been better to describe them as indifferent. Children with an excess of either character are described as *very bold,* or as *very shy.*

Feeling, or more accurately the expression of feeling in the child's reaction to the teacher and other persons of his environment, is characterized as *amiable, responsive, passive, sullen,* or *surly,* for which the symbols Am, Resp, Pass, Sull, and Sur are employed in the blank. The amiable child is characterized by a sweetness of disposition which is bound to make friends. Thus, amiability wins a teacher's regard and leads to efficient effort on her part, but amiability in some cases leads to an excess of feeling which is detrimental to the best intellectual work. The child who is classed as amiable possesses a character which is therefore of doubtful value for school progress. On the other hand, the child who is characterized as responsive is easy to work with, sympathetic, and is the most favorably situated child so far as feeling is concerned. The sullen child scowls and pouts, showing ill temper in facial expression but remaining silent. The surly child is more active in the expression of his ill humor, using voice and bodily action to demonstrate its presence. These children are difficult to treat in large classes. Their feelings, unless they are won over by a skilful and good-tempered teacher, are a serious bar to mental progress. The child who is indifferent in the expression of a state of feeling, and in his reaction to the teacher, is characterized on the blank as passive. Passivity may give free play to intellectual effort, and the passive child may furnish a more favorable soil for the teacher's efforts than the excessively amiable child, but feeling is a great stimulus to effort and it is probable that in most cases passivity is a relatively unfavorable soil.

A child's activity, whether of mind or body, may be such that we may characterize him as alert. When present in excess it becomes nervousness. At the opposite extreme is stolidity. For an intermediate grade between the stolid and the alert child, the blank employs the term *inert,* or *inactive·* The five grades are therefore *stolid, inert, alert, nervous,* and *very nervous,* represented respectively by the symbols Sto, In, Al, Nerv, and vN.

With respect to intellectual activity, all children may be divided into three classes,—the sensory or reflective, the motor or impulsive, and those who are neither. The latter group the blank designates as *normal*, though probably the term indifferent or mixed is to be preferred. The impulsive type is distinguished by the rapidity with which it responds to a question or other mental stimulus. This type of child does not stop to think. As soon as an appeal is made to it, there is an immediate response, which is frequently ridiculous on account of immature thought. The reflective type is characterized by relatively slow but intelligent responses. The blank subdivides the reflective and impulsive groups into two sub-groups, in which each quality appears in either a moderate or excessive degree. The blank, therefore, distinguishes children as *very reflective, reflective, normal, impulsive,* and *very impulsive.* The symbols for these words are vR, Refl, Norm, Imp, and vI.

For the classification of the will the blank distinguishes the *stubborn, wilful, firm, flexible,* and *vacillating,* using for the purpose the symbols Stu, Wilf, Firm, Flex, and Vac. These terms are self-explanatory. There may be some confusion, however, of stubbornness with sullenness and surliness. It is true that a defect of will is often associated with a defect of feeling, but I have examined many cases that did not show any ill humor, who yet simply refused to obey all commands.

One other character is of sufficiently general significance to be treated in connection with the items that form the subject of this chapter. The most superficial examination of a child will bring from him some utterance. In voice and speech, the examiner or teacher may quickly infer the presence of physical or mental defects. On the physical side the utterance of a single word in answer to a question may awaken the suspicion of naso-pharyngeal obstruction. The treatment of purely physical defects will be discussed later. In this place, I wish to consider defects of articulation, which are also active factors in causing retardation. Children with defective speech receive low grades in reading, and their intelligence is usually underestimated by the teacher, who attributes much of the speech defect to a lack of knowledge. These defects hinder progress in still another way. Such children are frequently ridiculed by their schoolmates on account of their impediments of speech. In this way they learn to dislike school, lose interest in their work, and become absentees. But more important than this is the effect of defective modes of articulation and phrasing upon written language. Some children with an infantile stammer write school compositions which mirror with great fidelity their habits of oral speech.

Defects of articulation are frequently associated with defective hearing, for a child who is unable to hear words distinctly will be unable to reproduce them properly. Observation has also shown that defects of articulation cause defective hearing of language. Children that appear to be deaf to words, improve when their defects of articulation are cured.

The words *stammer*, and *stutter*, are loosely employed by English writers to designate nearly every defect of speech. A definite meaning should be attached to each. In this blank the word *stammer* is employed to cover any defect of articulation, as, for example, the inability to produce certain sounds, or the substitution of one sound for another like *th* for *s* in lisping. A stammer may indicate defective organs of articulation, like a cleft palate,. displaced teeth, or a partial paralysis of the tongue. A stammer, however, may simply be the persistence of an infantile speech habit, "baby talk." This retardation in speech may be due to an undeveloped mind, or may be the result of adenoids or other obstruction in the resonance cavity, which may or may not have been removed. If the stammer is an infantile stammer, a check mark is made over the symbol *inf.*

The degree of the stammer is indicated by a check mark over one of the five numbers appearing to the right of the word *stammer.*

A *stutter* is characterized by a series of spasmodic hesitations and the frequent repetition of some of the spoken elements. This defect may be acquired by imitation. It may be the result of nervousness, or it may be due to an inability to co-ordinate the movements of breathing with those which control the articulation. Stuttering does not seem to have the same causal relationship to intellectual retardation as does stammering. The blank provides, as with other items, five grades for an estimation of the degree of stuttering.

From the record card on page 16, a blank partially filled in, we ascertain the following facts about the boy John Smith, which cause him to stand out as a distinct personality. He is seven years of age, has been one year at school, where he attended regularly, but where his conduct and progress were both very deficient. He is classified as a backward case, subnormal in intelligence. His co-ordination is only medium. He is bold in his association with his teachers, passive or indifferent in feeling towards them. He shows signs of nervousness. He is neither reflective nor impulsive, and is vacillating in will. We have also learned that while his health is fair, his nutrition is poor, and that he is trying to do his school work on a breakfast of coffee, bread and cake; that he also drinks beer and tea. This insufficient and improper diet, which probably is responsible in large measure for his nervousness, his vacillating will, and his deficient conduct and progress in school, is itself the result of the poverty of his parents, which enables them to give him but poor support in a home that is characterized as of very inferior culture, providing very deficient mental and moral discipline, and inadequate care of his person and clothing.

I turn now to *school history (Rel).* A large number of children are retarded because of frequent changes from one school system to another. This usually involves an initiation into a new course of study and the use of unfamiliar text books, with a consequent loss of time. Even the transfer from one school to another of the same system is frequently productive of the loss of a grade in the child's progress. The families of some of the children whom I examined had changed their residence at least half a dozen times during the school life of the children. In some cases this change of residence is made by the family, and even by the children alone, to escape the enforcement of compulsory school attendance. A brief summary of the school history of the child is therefore of importance if we are to estimate the influence of this factor in producing retardation. The symbol (*Rel*) is introduced chiefly to remind the investigator to enter a record of attendance in the parochial schools in the case of boys who are members of the Roman Catholic Church. The curriculum of parochial schools, as well as of other church schools, is very poorly articulated with that of the public schools. For this reason children who have attended parochial schools in the early years are apt to be retarded when they subsequently enter the public schools. Moreover, many children spend a year in the parochial school, at about the age of twelve, in order to receive religious instruction. These children lose a whole year of the public school work, and in some cases have lost step with their fellow pupils of the public schools to such an extent that they are scarcely able to begin again where they had left off.

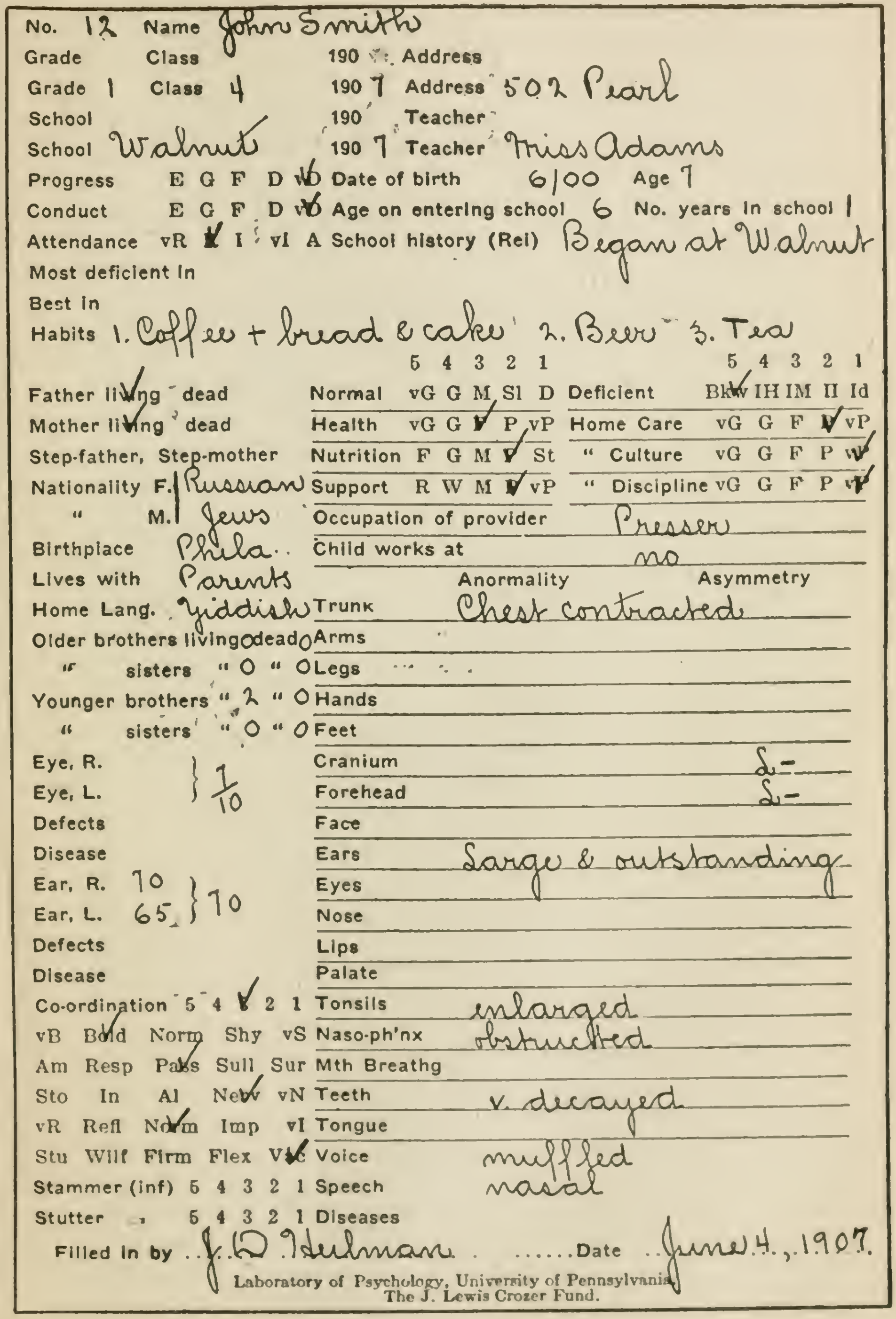
A child may be deficient in all his school branches, or he may show himself deficient in but one. If in certain grades this one subject happens to be arithmetic, it may prevent his making normal progress; in other grades it is language that is a great obstacle to progress. For this reason the items *most deficient in* and *best in* are recorded. Statistics obtained from large numbers of children will also throw some light on the question whether mentally deficient children commonly manifest ability and memory for some single line of thought or activity like music, drawing or manual work. It is a common belief, although not supported by sufficient evidence, that the public school system does not appeal to the capabilities of children who are exceptionally gifted in one line and possessed of counterbalancing deficiencies in other lines.

The child whose blank we have taken as an illustration had been only one year in school, and the absence of any record in the appropriate space leads us to believe that his deficiency in progress was manifested in all the work of the school.

Certain habits of life are found to exist among school children, which seriously interfere with their progress. Among these are the use of tobacco and injurious beverages, like tea and coffee and even beer and whiskey. Under *habits* I also recorded the amount and kind of food eaten at one or more meals, but especially at breakfast. Immoral practices are also to be recorded in this connection, but these should not be inquired into in every case. It seemed the better part of discretion to record facts of this kind only when brought to my attention by teacher or principal in those cases where such practices were notorious.

The family life may retard the progress of a child in school, in so far as it affects his health, nutrition, support, his care and discipline. The relation of these factors to retardation has already been discussed. In addition to these, a few other items concerning the family appear of sufficient importance to warrant the making of a record. If the child has lost one or both of his parents, the probability is that there has been a reduction in care, nutrition and health, for parents must be presumed to take a deeper interest in the welfare of their children than do relatives or friends. In the case of the father's death the children are often neglected because the mother is unable to bear the burden of support. Many mothers leave home early in the morning to go to work and return late in the evening; the children are left all day with no one to provide for their wants or to oversee them excepting when at school. The children of many mothers, who are the support of the family, find it difficult to obtain even one good meal a day. When such children are questioned they usually report tea and bread for breakfast and the same for dinner; some children go to school without breakfast. The loss of the mother is also very unfavorable to good home conditions. Her place may be taken by a step-mother, but the phrase "a step-mother's care" has lived long enough in the language of the race to persuade us of its significance. The loss of either father or mother is also an indication of the severity of the struggle for existence on the part of the immediate progenitors of the child, or it may point out a possible lowered resistance to disease.

The blank, therefore, provides for recording whether the child's father and mother are living or dead and whether the child has a step-father or step-mother. There is also a space provided in which to record with whom the child lives. A child may be living with relatives, guardians or acquaintances, who provide it with a home life distinct from that of its own father and mother. Abnormal home conditions are sometimes brought to light which are significant. If the child is asked whether he lives with his parents he will invariably respond in the affirmative, even though he may be living with only one of them. If he is asked, "Do you live with your father and mother?" he will invariably answer, "With my father," or "With my mother," if he is living with but one of them. A record which shows a living father must not be taken to demonstrate the fact that the father is the support of the child or even that the child is living with the father. The blood relations of the child are often in no wise responsible for the child's support and home care.



No. 12 Name John Smith

Grade Class 190 Address

Grade 1 Class 4 1907 Address 502 Pearl

School 190 Teacher

School Walnut 1907 Teacher Miss Adams

Progress E G F D [✓ vD] Date of birth 6/00 Age 7

Conduct E G F D [✓ vD] Age on entering school 6 No. years in school 1

Attendance vR [✓ R] I vI A School history (Rel) Began at Walnut

Most deficient in

Best in

Habits 1. Coffee + bread & cake 2. Beer 3. Tea

			5	4	3	2	1		5	4	3	2	1
Father [✓ living] dead		Normal	vG	G	M	Sl	D	Deficient	[✓ Bkw]	IH	IM	II	Id
Mother [✓ living] dead		Health	vG	G	[✓ F]	P	vP	Home Care	vG	G	F	[✓ P]	vP
Step-father, Step-mother		Nutrition	F	G	M	[✓ P]	St	" Culture	vG	G	F	P	[✓ vP]
Nationality F.	Russian	Support	R	W	M	[✓ P]	vP	" Discipline	vG	G	F	P	[✓ vP]

" M. Jews Occupation of provider Presser

Birthplace Phila. Child works at no

Lives with Parents Anormality Asymmetry

Home Lang. Yiddish Trunk Chest contracted

Older brothers living 0 dead 0 Arms

" sisters " 0 " 0 Legs

Younger brothers " 2 " 0 Hands

" sisters " 0 " 0 Feet

Eye, R. } 7/10 Cranium S–

Eye, L. Forehead S–

Defects Face

Disease Ears Large & outstanding

Ear, R. 70 } 70 Eyes

Ear, L. 65 Nose

Defects Lips

Disease Palate

Co-ordination 5 4 [✓ 3] 2 1 Tonsils enlarged

vB [✓ Bold] Norm Shy vS Naso-ph'nx obstructed

Am Resp [✓ Pass] Sull Sur Mth Breathg

Sto In Al [✓ Nerv] vN Teeth v. decayed

vR Refl [✓ Norm] Imp vI Tongue

Stu Wilf Firm Flex [✓ Vac] Voice muffled

Stammer (inf) 5 4 3 2 1 Speech nasal

Stutter 5 4 3 2 1 Diseases

Filled in by J. D. Heilman Date June 4., 1907.

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The J. Lewis Crozer Fund.

The language of the child's home may be an important factor in producing retardation in school progress. Some children of foreign parentage are retarded for several years because they are not equipped with a knowledge of the language of the school and many school systems fail to provide for proper instruction in the English vocabulary. Every large city has some sections where the children, even at play, speak a foreign language. The necessary information to estimate the importance of this factor in an individual case is given in connection with the items *nationality F* and *nationality M,* which provide for the record of the nationality of the father and mother, and with *birthplace* and *home language.* When a child is foreign born I found it convenient to inquire as to its age at the time of immigration and I sometimes recorded this in connection with the item *birthplace.* Even English-speaking children who come to this country at eleven or more years of age lose at least a year on account of the difference in the curriculum.

The remaining items with which we have to deal are concerned with the child's physical condition. We obtain some indication of the child's physical vigor, vitality and viability when we know the number of brothers and sisters living and dead. It is very difficult to ask a child or even an adult the necessary questions in such a manner as to elicit exact information of the character we desire. The blank records data in a way that appears to present the question in the best possible form for answer. A numeral records the number of *older brothers living* and *dead,* the number of *older sisters living* and *dead,* the number of *younger brothers living* and *dead* and the number of *younger sisters living* and *dead.* The boy whose blank we have taken as an illustration has two younger brothers, both of whom are living. The information obtained from these items is very meagre. We know only that he is the first child. According to some authorities, the first child is more apt to suffer from accidents of birth than later children. A physician interested primarily in the child's physical history would want to know very much more in this connection than is provided for by the blank. For example, he would require a history of miscarriages. No matter how valuable such data may be, it would be undesirable to make an effort to obtain them. It is only when children are brought for examination to a clinic by father or mother that such facts can be ascertained. Discretion as well as the limitation of time render it necessary to omit many other items, for example, the birthplace and condition of the grandparents. The blank probably provides for as many items in this connection as it is wise and convenient to endeavor to obtain.

The purposes of the blank must be borne in mind when we examine the remaining items which deal with the physical condition of the child. Space is provided for an entry of the results of a brief examination of eyesight and hearing and for the record of marked *anormalities* or *asymmetries* of the *trunk, arms, legs, hands, feet, cranium, forehead, face, ears, eyes, nose* and *lips*. Space is also provided for a record of anormalities that are often associated with naso-pharyngeal obstruction,—leading in some cases to a diagnosis of adenoids. Thus, the condition of the *palate* is to be observed, the *tonsils*, the *naso-pharynx*, the *teeth*, the *tongue*. If *mouth breathing* exists, it is to be recorded; the *voice* is to be observed for symptoms of adenoids and the quality of *speech* is to be recorded for the same purpose. Finally, a brief record is to be made of the *diseases* from which the child has suffered during infancy and childhood. The examination from which this record will be filled out is superficial and is directed only to the ascertainment of striking defects. Time is wanting, nor is it practicable to subject a child to an extensive physical examination. A child ought not to be touched nor can many instruments be used to facilitate the work of the examination. A medical inspector may perhaps use a tongue depresser, but experience in some cities has shown that even they had better employ some such common article as a spoon for the purpose. The tests which I employed excited no criticism, excepting in the case of one child who refused to take part in the test of hearing, for which I employed an instrument. I feel that I went as far as it is wise for any one, excepting a medical man, to go, and that even the medical inspector could not take much more advanced measures without awakening a storm of criticism. From the standpoint of medical inspection, such results as I obtained with this blank must necessarily be unsatisfactory, but this same criticism holds good also of much of the medical inspection that is made in the schools to-day, excepting in so far as it relates to the discovery of contagious diseases and parasites.

From the nature of my investigation it was impossible to make anything like a thorough examination of sight and hearing. The limitations of time and the lack of proper rooms and instruments practically confined my work to a hasty test of the child's ability to see and hear. To examine eyesight, I employed Snellen's test cards, both the alphabet and illiterate types, the latter for children who did not know the alphabet. Where the child's familiarity with the alphabet was in doubt, a brief preliminary drill was employed to determine whether the inability to read the line was due to ignorance or defective vision. None of the children examined by me were under ten years of age, and I seldom was compelled to resort to the illiterate card.

On account of the dimensions of most of the rooms in which I tested the eyesight of the children, I was obliged to make use of the ten-foot line. In making my tests, I placed the cards so that the ten-foot line was about level with the eyes and squarely in front of the child. I placed it so as to be in a good light and to avoid strong reflections. If the child wore glasses, I tested him with and without them. Both eyes were tested together and each separately. During the test I always looked at the child to be certain that when one eye was tested the other was covered and to observe excessive hesitation and signs of eye-strain. In cases of strain and marked hesitation, the child was asked to move toward the cards until the letters on the line were read easily. Before beginning the test, I laid off a ten-foot range, which I subdivided into feet. When, therefore, the child moved from a distance of ten feet to a shorter distance I was able at once to note the distance in feet at which he read the line. The blank on page 31 shows that John Smith read the ten-foot line at a distance of seven feet with both eyes, and the ditto marks opposite *eye R* and *eye L* show that with each eye separately he read the line at the same distance. His sight is therefore sufficiently defective to justify the recommendation that his eyes be examined by an oculist.

Various tests are employed to measure the acuity of hearing. All of these fall into one or the other of two classes; the first is a speech test, and the second is a test with mechanical sounds. The speech may be either whispered or conversational. Undoubtedly the test which employs conversational speech is of the greatest value, for it tests the child's ability to hear conversation, upon which depends his apprehension of oral instruction in the school room. A conversation test, however, is objectionable because it requires a very large room. To avoid this difficulty the whisper test is usually employed as a substitute. Both speech tests are open to the practical objection that the intensity of the sound cannot be kept constant. Moreover, much time is required to carry out the tests satisfactorily, and the results vary with the acoustic properties of different rooms, depending upon their size and shape and upon convection currents due to the unequal heating of the air. Similar objections may be offered to the employment of mechanical sounds for testing hearing. The watch, the

Politzer acoumeter, tuning forks, and specially constructed audiometers, are the instruments usually employed. No instrument has yet been devised which furnishes a constant and accurately measured standard of sound intensity. In my tests I employed an audiometer which is to be recommended, not as an instrument of precision, but as a convenience for rapid testing.

This audiometer consists of a box, six inches by seven inches by eleven inches, divided by a partition into two parts. In one compartment of the box is placed a small clock as the source of sound. The other compartment contains a specially contrived stop-cock connected with a metal tube, which at one end divides into two branches for conducting the sound impulses to each of the two ears. These two branches project about an inch beyond the box. To these, when the instrument is to be used, rubber tubes are attached, which connect with the ear-piece of a binaural stethoscope. The stop-cock which regulates the size of the opening through which the sound is allowed to pass, is connected with an index finger moving over a graduated disk, arbitrarily divided into one hundred divisions. When the index finger points to the zero mark, the tube is open to its fullest extent. When it points to one hundred, it is entirely closed. The least audible sound for most normal ears is obtained with the index finger at the mark 92. The instrument is provided with two other stop-cocks, one on each of the two branches of the tube. These are to shut off the sound instantaneously from one of the two ears and without the subject's knowledge. The advantages of this audiometer are found in the convenient variation of the intensity of the sound and its measurement with some accuracy on an arbitrary scale, and in the ease with which the sound can be shut off from one or both ears so as to test the reliability of the subject's responses. With this instrument the child whose hearing capacity is measured by 70 for the right ear and by 65 for the left ear (see blank on page 31) has subnormal hearing in both ears, the left being slightly more defective than the right. This record, especially when taken in connection with facts which give rise to the suspicion of adenoids, is sufficient to warrant his being referred to the medical inspector or to a medical clinic for the nose, ear and throat, for examination and treatment.

Spaces are provided for the record of *disease* and *defects* of the organs of sight and hearing. It is intended that only those diseases and defects shall be recorded which attract attention on superficial examination. These include sore and inflamed eyes, strabismus, nystagmus, certain readily observed defects of pupil and iris, a running ear or a perforated ear drum.

Ample space is provided to record marked *anormalities* and *asymmetries* of bodily members and their functions. It is impossible in this article to attempt a statement of the various physical anormalities and asymmetries that may be reported under this heading. Defects may be recorded for their own sake, or because they have diagnostic value as symptoms or stigmata of degeneration and arrested development. The reader must be referred to the copious literature on this subject for information as to the particular defects which may be considered worthy of being recorded. What will be recorded will depend very largely upon the extent of the information possessed by the investigator, on the purposes of the investigation, and on the interest which the investigator may take in the association of physical defects with retardation. I made no attempt at a thorough examination or record of minute deviations of different parts of the body from the normal type, whether in structure or function. My record of the boy whose card I have taken for an illustration shows the cranium and forehead to be smaller on the right side than on the left. It is also reported that the ears are large and outstanding. All the other items recorded have a significance in connection with the diagnosis of naso-pharyngeal obstruction. The chest is reported to be contracted, the tonsils enlarged, the voice muffled, and the speech nasal. He is also reported to have badly decayed teeth, which are frequently found associated with enlarged tonsils and adenoids.

The last item on the blank to be considered is *diseases*. These include measles, chicken pox, mumps, scarlet fever, diphtheria, whooping cough, meningitis, and convulsions. On the card reported above, no diseases are recorded. This was the case with very many cards. It does not mean, necessarily, freedom from disease during infancy, but perhaps only lack of information. It is difficult, if not impossible, to extract satisfactory information from the child, and I believe that physicians encounter the same difficulty in obtaining accurate information even from the parents. It must be borne in mind that an investigation such as I conducted can only endeavor to obtain the fullest and most exact information possible under the circumstances.

We are now prepared from examination of the record of Jonh Smith to make a tentative statement of the causes of his very deficient progress in school work. He is seven years of age and has been in attendance at school one year. There is no evidence to be had from the blank that deficient progress is due to inefficient instruction, nor can it be ascribed to delay in entering school, or to irregularity in attendance. He is the child of Russian Jews who speak Yiddish at home. This may be responsible to some extent for his inability to progress at school, but it must be remembered that the child was born in this country, and other Russian Jewish children under similar circumstances are progressing normally in school work. It is rather to the naso-pharyngeal obstruction, the result of poor nutrition, due to insufficient support at home and deficient home care, that I would attribute his retardation in school work. The nasal speech, the muffled voice, the enlarged tonsils, the contracted chest, the subnormal acuity of hearing, his nervousness, and even his vacillating will, are a group of phenomena which suggest adenoids. Adenoids are merely an enlargement or hypertrophy of lymphatic tissue in the naso-pharynx. They may be due to the very decayed teeth, which act as a source of infection to the tonsils and adenoid tissues. The naso-pharyngeal obstruction and the decayed teeth may both result from the insufficient nutrition, the presence of which is attested by the customary breakfast of coffee, bread and cake.

The remedies to be suggested in this case are partly medical and partly social. He should be referred to the medical inspector and taken by his parents or a school nurse to a clinic for nose and throat diseases for examination and treatment. The insufficient nutrition may be due to the impoverished condition of his parents, or to ignorance. The solution and treatment of this problem must be left to the various social and philanthropic agencies, which in our large cities are beginning to attack the problem with determination and scientific insight.

CHAPTER II.

Preliminary Steps and Miscellaneous Problems.

During the school year 1905-06, there were enrolled in the elementary schools of Camden, N. J., 12,801 children. If only those children of the first grade whose ages were below seven and those of the second grade whose ages were below eight, and so on for the rest of the grades, were taken to be of normal age for their respective grades, then only 28 per cent of all the children were of normal age for their grades. If the upper age limit of the normal child were raised one year for each grade, the percentage of normal children rose to 53. If still another year were added, making all children in the first grade below nine of normal age for the grade, and all those of the second grade below ten normal, then 74 per cent, or 9500 children composed the normal group. This left 3372 for the abnormal or retarded group.

During the latter half of the school year 1905-06, this retarded group of children was made an object of special investigation by Mr. James E. Bryán, the city superintendent, in order to determine the conditions favoring retardation. He was assisted in his efforts by the public school teachers of the city to whom were sent special forms calling for the following data: name, residence, age in years and months, number of years in school, length of time in present class, present progress, attendance, sight, hearing, general health, and special data which referred to inattention, mental deficiency, and bad conduct. After the teachers had received instruction in the method of procedure they obtained the above data for 2033 retarded children and recorded them upon the special forms or blanks. To all of this material I had access, and after having obtained permission from the Camden school authorities to make my clinical study of the 2033 cases, I transcribed it on blanks prepared for the purpose, so that I could refer to it at any time during the course of my inquiry.

At this stage of the investigation my efforts had been concentrated upon four objects. The first was to study the extent of retardation for different school years and various school systems. I found that retardation was not a local condition, but was widespread and chronic. The second step was to obtain permission from the school authorities of Camden to make the investigation. Here there was some cause for apprehension. It was feared that patrons of the schools would not take kindly to such an innovation, especially since Mr. Bryan had conducted his investigation the previous year. Children might object to an examination, and even to such questions as required them to state of what their breakfasts consisted. Additional teachers would be required to substitute for the regular teachers while they were being interviewed in reference to the retarded children in their rooms, and thus additional expense would be incurred. In spite of these misgivings it may be said that the whole investigation met with practically no opposition. There was an occasional teacher who seemed to have no sympathy with the work; an occasional parent who declared that his child should not be examined; yet of all the children asked only two refused, one in obedience to her mother's command, and another out of sympathy for her school mate who had already refused. There was practically no resistance on the part of the children; some, indeed, felt very much disappointed upon learning that they would not be examined. The third object was the preparation of the blank described in the first chapter, and the fourth the transcription of the data referred to in the preceding paragraph.

The next step was to undertake the actual examination of the children. It was begun in the latter part of February, 1907, and concluded the last week in May of the same year. To this part of the work I devoted about sixty days. One half of the time was given to collecting data from the teachers and the other half to examining about one thousand children. Usually I was able to devote between five and six hours a day to the work in the schools. Consequently, I could give only about ten minutes to the examination of one child. Had it been possible to devote more time to this phase of the investigation its merit, no doubt, would have been much enhanced. A number of factors co-operated to make this impossible. In the first place the total amount of time was limited, because I was not prepared to begin the work earlier in the year, and because the city superintendent requested me to finish it before June so as not to disturb the schools during the time for examinations and promotions. On account of numerous withdrawals it would have been unwise to attempt to carry the investigation into another year. I was unwilling to decrease the number of children on account of the ill effects of errors with small numbers. Unless the number of children were reasonably large it would also be impossible to make symptomatic correlations. Moreover, to exclude any of the retarded children from my investigation would have compelled me to abandon my original purpose of making some statement relative to each one of the 2033 retarded cases.

Before visiting a school, blanks like the one described in the first chapter were prepared for all the retarded children belonging to that school. Upon every blank were entered the facts necessary to locate a child, viz.: the name of the school and teacher, and the name of the child with its grade, class, and home address.

The work at the school was carried on in the principal's office and was begun by getting all possible information from the principal and the teachers of the grades in which the children happened to be, or had been the previous year. It is very important that some knowledge of the child be obtained before meeting it, in order that special attention may be given to defects and adverse conditions which others have observed. Moreover, confidence in my own observations made upon children was increased or diminished according to the confirmation or negation of the teachers.

After the teachers had been interviewed the work of examining and questioning the children was begun. That they should not be influenced by each other's answers, no more than two children were allowed in the room at one time. This was found to be a very desirable number. Very few children showed signs of fear or confusion. The child who was the first to be examined, showed most timidity and awkwardness in responding to the tests and questions. Having been allowed to look on, the second child had acquired some familiarity with the method of procedure, some knowledge of what was expected of him; he also took note of the harmlessness of the instruments and tests employed, and acquired a certain degree of willingness to answer questions which were similar to those he had heard others answer. In this way the reactions of the children were very much facilitated and the element of fear practically eliminated. For the nature of the tests and the character of the questions the reader is referred to the description of the blank in the first chapter.

It was impossible for me to examine even a majority of the 2033 cases whose names I had received. For this a variety of causes were responsible. From an inspection of the data which I had received from the city superintendent, it appeared that errors had been made in entering as retarded the names of twenty-nine girls who in reality belonged to the group of children of normal age. Moreover, the name of one boy appeared twice. He had evidently been transferred during the period of Mr. Bryan's investigation. Consequently, it became evident from the material in my possession before beginning the investigation, that 2033 constituted the whole number of retarded children, of whom 1075 were boys and 928 girls.

Upon beginning my work with the children I discovered at once that the original number would be still further considerably reduced. Second in importance in bringing about this state of affairs were absentees on the days I visited the several schools. To make another attempt to see these children was out of the question on account of a lack of time. Moreover, three efforts which had been made to see all the retarded children of a few schools, proved unsuccessful. The number of absentees for the boys was 123 or 11.4 per cent; for the girls 102 or 11 per cent. Among the girls there were also two who refused to be examined.

On account of overcrowding, promotions, and changes of residence, a number of children had been transferred to other schools in Camden. Of these children I was able to see only those who had been transferred prior to my visiting the schools where they were finally entered. It was not even possible to see all of these, for many had not entered the schools to which they had been transferred. Children will resort to every possible means to evade the compulsory attendance law. Their schemes sometimes completely baffle the attendance officers. I know of a case who had two addresses, one in the city with his parents and the other in an adjoining township with his grandparents. The attendance officer of the city was told that the boy lived with his grandparents in the country, and the officer of the country district was informed that the boy lived with his parents in the city. Of the 155 children reported to have been transferred I could locate only 42, leaving 113 unexamined, 65 boys and 48 girls.

A certain number of boys and girls were reported to have left the Camden schools. This indeed was the most dominant factor in preventing a re-examination of the entire group. There were 368 boys and 313 girls, a total of 681, who withdrew from school in a little less than one year's time; for Mr. Bryan's investigation, during which these children's records were first made out, was carried on during the months of May and June, 1906, while I began to re-examine them in the latter part of February, 1907, and concluded my work in the latter part of May in the same year. In less than a year, therefore, 34 per cent of the 2003 cases whom I attempted to re-examine had left school; 34 per cent being boys and 33 per cent girls.

These percentages would no doubt have been increased had it been possible to locate all the transferred children. It is very likely that many of them had left school.

It is interesting to note that the percentage of children who withdrew from the retarded group exceeds the percentage of those who withdrew from the group of so-called normal age. From the available data it appears impossible to obtain accurate results, but an attempt can be made. The number of children enrolled in the Camden schools at the end of September, 1905, was 11,117. There were, however, 1684 accessions during the year. Most of these occurred shortly after the schools opened, so that of the 1684 children entering during the year about 1000 were enrolled near the beginning of the school year. We may therefore say that 12,117 children entered the Camden schools in September, 1905. During the year there were 3072 withdrawals; *i. e.* 3072 children withdrew from 12,117 during the course of one school year. This gives a percentage of 25.4; as the percentage of withdrawals from the retarded group was 34, it exceeds the percentage of total withdrawals by 8.6. The excess of withdrawals from the retarded group over those from the normal group must consequently be still greater. It is, however, to be observed that the elimination for the total number occurred between September and June, inclusive, and for the retarded group approximately between the beginning of June and the early part of April. Therefore the retarded group had the advantage of the withdrawals during the long summer vacation. It is quite likely that after this period a large number of children do not return to school. On the other hand it must not be overlooked that the elimination for the non-retarded group only would be less than 25.4 per cent and that it would be higher for the retarded group, if information of all the transferred children were to be had. In view of these considerations it is justifiable to claim that the retarded children, the very ones who have profited least by public education, are the first to leave school. The children who are the most poorly equipped to fight the battles of life, are the first to abandon their school training. The whole number of children whom it was impossible to reach on account of refusals, absences, transfers, and withdrawals was 1021. Of these 556 were boys and 465 girls. For the boys the percentages of absentees, transfers, and withdrawals were 11.4, 6, and 34.2 respectively. For the girls these figures given in the same order were 11, 5.3 and 33.7. In every case the percentages for the girls are slightly lower than those for the boys, but they are so nearly the same as to indicate practically no sex differences. The percentages of children who could not be reached is 50.9 for the boys and 50.1 for the girls. Consequently, I was unable to reexamine one-half of the original number. I began to make out records for 2003 cases but succeeded in completing only 982. In order that I might have the data of at least 1000 cases, I examined 30 retarded children whose names I had not received from the statistical investigation. By using 18 of these extra cases in connection with the 982, I obtained the 1000 cases, 533 boys and 467 girls, upon which the results of this study are based. The facts enumerated above are summarized in table I in the appendix.

Although the withdrawal of children from school is of sufficient importance and extent to be a problem for a separate inquiry, I thought it might be interesting and of value, to collect such data upon this subject as would enable me to make some statement about each one of the 681 retarded children who withdrew from school. From the nature of my investigation I could gather only such information as was easy of access, and therefore I am prepared to speak in definite terms about no more than 420 of the withdrawn children. Of the remaining 261 children there were 119 cases, 63 boys and 56 girls, who were reported to have left the city of Camden. I possess no information whatever about 59 boys and 83 girls, the remainder of the 261 cases.

I shall now turn to the 420 cases, 246 boys and 174 girls, concerning whose life after they had left the Camden schools I can make more definite statements. There were 8 boys and 3 girls who entered business college, 14 boys and 7 girls belonging to parochial schools, and 3 boys and 1 girl who attended other schools. Consequently, there were 36 cases, who, although having left the Camden public schools, had not abandoned their efforts to secure an education,—they were still attending some school. From the Camden school records, however, it appeared that they had withdrawn. The school records, therefore, are a poor source of data for investigating the problem of elimination from school. From these records it appeared that 420 children had left school, but 8.6 per cent of them had merely left the public schools.* Moreover, the school records reported the 119 children who left Camden as having withdrawn, but it is more than likely that a large percentage of these were attending other public schools. In fact, in a few cases I received positive information that they were attending school at other places. It is also likely that a large number of the 142 cases, concerning whom I was unable to obtain data, were still in school at some place; but these, too, from a mere study of the records, appeared to have been eliminated. It is the shifting character of our population which is responsible for much apparent elimination. Of the 420 cases who are now under consideration I was informed that 192 boys and 91 girls were at work. The number of boys who were at work, therefore, far exceeds the number of girls; but if those who were reported to be at home be added to the number engaged in some kind of work, the sum for the boys will be 194 or 82.2 per cent of the total 2003, and for the girls 138, or 79.3 per cent. In many cases it appeared that the kind and permanency of a boy's position were rather closely associated with the quality of his work at school. In many cases I attempted to find out what kind of work the boys were doing. Not infrequently I received the reply that they changed so often that it was impossible to keep track of them. Upon inquiring into their school history I learned that they had been rather shiftless pupils.

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* This percentage is evidently higher for the group of children of normal age.

Usually poverty is regarded as one of the important factors in causing children to leave school, but from my investigation it does not appear to be very significant. Out of the 420 children there were only 3 whose homes were in such want that their assistance was required. There were 27 cases who were unable to attend school the whole or greater part of the year on account of ill health. Only 8 of these were boys. They are 3.3 per cent of the whole number of withdrawn boys of whom I was able to collect any data. The percentage for the girls is 10.9. This is more than three times that for the boys. Of the 2003 original cases, some definite knowledge was furnished about 1742. Of this number 5 had died, 3 of them boys; 1 boy and 1 girl had been sent to prison. From the fact that 12 of the children, all of them boys, were out of school on account of bad conduct, we may have some indication of the ability of woman to discipline the boy. Most of these cases it was impossible to keep at school on account of their demoralizing influence. Hence it appears that the school system was not adequate to offer instruction to all the children whom the law required to attend school.

From the whole retarded group only 9 entered the high school in September, 1906. These 9 cases were in reality not furnished by the whole retarded group, for there are 261 cases of whom I have no information, and as some of these may have entered the high school of another city the 261 should therefore be deducted from the 2003, leaving 1742 as the number from which the 9 high school pupils came. In June, 1906, there were 9729 children enrolled in the Camden schools. This was only a short time after Mr. Bryan's statistical investigation, during which a record was made of the 2003 retarded cases. As the investigation was made somewhat before the end of June, we may say that at this time there were about 10,000 children on the rolls. If the retarded group be deducted from this number about 8000 will remain; from these all but 9 of the children who entered the high school were drawn. If the normal group of 8000 children furnished pupils for the high school in the same ratio as the retarded group, then only 50 children would have entered the high school in September, 1906, whereas this number was 129. We may therefore conclude that less than two-fifths as many children from the retarded as from the normal group entered the high school. The foregoing figures are set forth in table II, in the appendix.

CHAPTER III.

RESULTS AND THEIR TREATMENT.

The collation of data was begun by establishing for each case the amount of retardation in years and half years. The statistical data received from Mr. Bryan represented each child of the first grade as being at least nine years of age. Several factors, however, co-operated to reduce this lower limit of retardation for many cases. One of these was a recognition of classes in calculating the amount of retardation. In each grade of the Camden schools there are two classes, one of which is more advanced than the other. According to the data which I received from Mr. Bryan a child was retarded the same amount regardless of class, but in my computations, I took the child in the higher class to be retarded one half year less than the one in the lower, and this reduced the amount of retardation for many cases by one half year.

There were also surprising discrepancies in age. In some cases these amounted to two years, thus making a child who had been retarded two years according to the statistical investigation, of normal age according to the clinical. From a comparison of the data which I received, and the data which I collected, it appeared that there was a lack of uniformity among the Camden teachers in recording the children's ages, some taking the register age and others the age of the children in May or June, 1906, the time of the statistical investigation. According to my method of calculating the amount of retardation it was increased for those children whose register age was given but reduced for some of the others. I determined the age for all the children up to the first of February, 1907,* about the time of the mid-year examinations, and took the grade and class in which they were directly after the examinations, for this was the time of my inquiry. An example may serve to illustrate in what way the amount of retardation was reduced for some of the children. A boy in the first grade whose birthday was on May 30, 1897, was examined and had his age recorded by the teachers on June 10, 1906. Consequently this boy was nine years of age and in the first grade. He therefore properly belonged to the retarded group. He made the June promotions for 1906 and the February promotions for 1907. He must then have been in the second grade, and in order to be retarded, his age should at least have been ten years. But according to my way of calculating age, he was only nine years and six months by the first of February, and consequently did not belong to the retarded group.

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*Evidently it would have been more accurate to calculate the ages up to a time midway between two examination periods.

The co-operation of two or more of the above-named factors in a single case lowered the retardation of 129 of the 1000 children sufficiently to exclude them from the retarded group. By assuming seven years to be the normal age for the lowest class of the first grade, seven and a half years the normal age for the highest class of the first grade, eight years as the normal age for the lowest class of the second grade, etc., and calculating upon this basis the amount of retardation for each child in years and half years,—taking the time for calculating the age simultaneous with the time for promotions,—I found that the amount of retardation for the boys varied from one year and less to seven years, and for the girls from one year and less to seven and a half years. The exact character of the retardation is given in table III. in the appendix.

From what has just been said and from what was stated on earlier pages of this monograph, it appears that unless great care is taken in compiling and analyzing enrolment figures the results obtained from them in calculating the extent of retardation are apt to be very misleading. From an analysis of the total enrolment figures for 1905-06 Mr. Bryan found that 3372, or 26 1-3 per cent of the children were retarded, but when he made his statistical investigation at the close of the school year he found only 2033, or more accurately 2003. How is this difference to be explained? Some of it may be accounted for by a reduction in the school population. The total enrolment was 12,801. This is the number analyzed to determine the extent of retardation; but at the time of the investigation there were only about 9729 children on the roll. Some of it may be accounted for by absentees, but this factor does not seem sufficient to explain the reduction from 3372 to 2003. Hence we must look for an additional cause. The total enrolment showed the ages and grades of the children as they were when they entered school. When the teachers made special records for the retarded children in May and June, some of them took the register age of September, or the time when the children entered school, but their grade for May and June. As there was a mid-year promotion, the grade of the children was raised but their age remained the same as that of the enrolment figures. According to the enrolment figures, therefore, from which it appeared that 3372 children were retarded, a child may have been nine years old and in the first grade in September, thus being retarded; but according to the statistical investigation this same child was taken as nine years old the following May, even though it had in the meantime been promoted to the second grade, in consequence of which it was not retarded. In this another cause appears for the discrepancy in the number of retarded children as found by the analysis of the enrolment figures and the statistical investigation. I have already shown how the number of retarded children as found by the statistical investigation was further reduced by the clinical investigation.

In determining the amount of retardation for the 1000 children who are the subjects of this study, I assumed that seven years was the normal age for the first grade, eight years the normal age for the second and so on for the other grades. But how is this to be justified, for it is evident that some children enter the first grade at the age of five or six, or even when they are older? In fact, I found that the age of entrance varied from five to twelve years. This is shown more in detail in table IV. Should not the age of entrance of each child be taken as its normal age in the first grade? I should say yes, provided the curriculum were adapted to the stage of the child's development when he entered. For this group of children I think the normal age can best be determined by computing the average amount of retardation for each age of entrance. The age for which the average amount of retardation is least should then be taken as the normal age for the first grade.

There were sixty-one boys who entered school at the age of five years. Of these, four were retarded one year or less if seven years be taken as the normal age of the first grade, lowest class; seven and a half years for the first grade, highest class; eight years for the second grade, lowest class, and so on. Under the same conditions nine were retarded 1½ years; six, 2 years; seventeen, 2½ years; eleven, 3 years; ten, 3½ years; three, 4 years, and one, 4½ years. The average amount of retardation in years for the sixty-one cases may thus be shown to be 2.57 years. By calculating in the same manner the average amount of retardation for the groups of children who entered at 6, 7, 8, 9, 10, 11 and 12 years of age, we obtain respectively 2.58, 2.56, 2.98, 3.37. 3.91, 4.00, 4.50 years. The average retardation therefore for the three lowest ages of entrance is practically the same, and it is not until entrance has been postponed to the eighth year that there is a notable increase in the amount of retardation. The series for the girls corresponds closely to that of the boys. Writing them one below the other, they are as follows:

Age of entrance—

	5	6	7	8	9	10	11	12
Boys . . .	2.57	2.58	2.56	2.98	3.37	3.91	4.00	4.50
Girls . . .	2.71	2.64	2.66	2.88	2.98	3.88	4.25	4.50

Had six years been chosen as the normal age for the first grade, for the purpose of finding the above averages, each average would have been increased one year and the first three would still be the lowest. Had eight years been taken, each average would have reduced one year and the first and the third would have remained the smallest. Taking the series as given above, the averages for entrance at five and six years are the same as those for entrance at the age of seven. But in this connection it must be remembered that the children who entered at five attended school two years longer than those who entered at seven, and those who entered at six one year longer. But for this increased attendance they made no progress. They were an expense and burden to the school system which cared for them one and two years before they began to develop. Had they entered at the age of seven years they would have made the same progress in the course of their school history, would have cost the school system nothing, and would not have interfered with the progress of those who were older, by overcrowding the lower grades. It is true that those who entered at the age of seven years attended one year longer than those who entered at eight, but they were benefited by it because their retardation is shown to be less. Hence we may conclude that seven years was the most favorable age for the children of this group to enter the Camden schools. This is most probably true of other retarded groups, who are attending school where the curriculum is similar to that of the Camden schools. It would seem worth while to determine the most favorable age of entrance for children who are of normal age for their respective grades. (See table V).

Where shall we look for the cause of the excessive retardation of children who enter school before the age of seven? Evidently we must begin with their age, because this is the only respect in which they differ from those retarded children who enter at seven. It is contrary to experience to say that children between five and seven years of age are in a stage of non-development. They may, however, be too immature to profit by what the school has to offer. If this be the case, the school curriculum should be so modified as to be adapted to the capacity of these children, or there should be a revision of school laws regulating more precisely the age when children should enter school. To attempt to feed a child's mind with pabulum upon which it does not thrive may not only mean a financial waste to the school system, a hindrance to the growth of other children, and a needless expenditure of energy and time on the part of the teacher, but it may mean life-long harm to the child itself.

The amount of retardation having been determined, I attempted to account for it in each individual case, by collating such of the data on the clinical examination blanks as I had assumed to be the causes of retardation. Most of the causes recorded on the blanks I subsumed under three general heads, viz., physical, social, and mental or psychical. Under the physical I classed health, nutrition, adenoids, speech, sight, hearing, tonsils, and smoking; under the social, entrance, attendance, school history, home life, and language; and under the mental, mental deficiency and conduct. Home life embraces "support," "home care," "home culture," and "home discipline". These and other items mentioned under the headings of physical, social, and psychical causes are fully described in Chapter I.

Depending somewhat upon the kind and intensity of the cause, I was frequently in doubt as to its activity in producing retardation. This gave rise to a division of causes into those whose activity was doubtful and those concerning whose influence no doubt was entertained. The latter were called real causes and the former doubtful causes. With the exception of smoking all the causes appear as real. From the list of doubtful causes, adenoids, entrance, attendance, and mental deficiency were excluded. Therefore, health, tonsils, nutrition, speech, sight, hearing, conduct, home life, language, and school history are common to both groups of causes, a certain degree of intensity being adapted as distinguishing one group from the other. The system of grading found upon the blank was followed in classifying the causes.

The distinction between a real and a doubtful cause was perhaps chosen in an arbitrary way, but it was not employed capriciously. An attempt was made to apply it uniformly throughout. Health was always taken as a real cause when rated below the medium, or when there was a past history of ill health. It was always classed as a doubtful cause when it appeared on the blank simply as of medium grade. All ratings of health which were above the medium were considered normal, unless there was sufficient evidence on the back of the blank to make out a case of previous ill health.

The classes for nutrition were determined in the same way as those for health. When of medium grade it was taken as a doubtful cause; for all lower grades as a real cause; and for all higher it was neglected. This method of classifying nutrition was modified by signs of rickets or other indications of former poor nutrition.

Adenoids were always taken as a real cause.

Enlarged tonsils were taken as a doubtful cause unless medical opinion had judged them to be a source of considerable injury to the health of the child. Except in a very few cases they constituted one of the symptoms for the diagnosis of adenoids.

Speech defects were of two kinds, stammering and stuttering. A stammer rated as medium or above and a stutter rated above medium, or a combination of the two defects in a single case, were real causes. For all other ratings speech became a doubtful cause.

Sight was treated as a doubtful cause when it was either 2/3 or 7/10 normal for both eyes; when it was 2/3 or 7/10 for one eye and less than normal for the other; or when one eye was normal and the other less than 2/3. If it was more defective than 2/3 for both eyes, it was a real cause; also if it was less than 2/3 for one eye and below normal for the other. Less defective vision than 7/10 for both eyes and 2/3 or 7/10 for one eye, in case the other eye was normal, was neglected.

Hearing was normal when its acuity was above 70 for both ears or when it averaged above 70 in case it did not fall below 61 for either ear. All degrees of acuity between 61 and 70 inclusive for both ears, or all degrees that averaged between 61 and 70, unless it was less than 30 for one ear, were taken as doubtful causes. Hearing was classed among the real causes when it was less than 30 for one ear or averaged less than 61 for both.

Entrance and attendance appear only as real causes. A child who entered after seven years of age was thought to have a real cause of retardation. Similarly a child who missed one-fourth or more of the school time was recorded as having a real cause.

"Home care," "home culture," "home discipline," and "home support" are all involved in determining the class of causes for home life. As there are four different items with five grades each, it would be very tedious to set forth in each case the criteria which determined the class of causes for home life. A general idea may be given by stating that when the ratings were equivalent to three P's or less, home life was taken as a real cause. It became a doubtful cause when the ratings were above those required to make it a real cause and equivalent to or below four F's.

The school history of a child was thought to be a real cause of its retardation, when it involved attendance at either a rural, foreign, or parochial school, or no less than four different city systems. If there were less than three changes of city systems they were regarded as comprising a doubtful cause under the heading of school history.

If the birth-place of a child was foreign, and a foreign language was spoken exclusively in the home, language was considered a real hindrance to the child's progress. Most of the records, however, were accompanied by the teacher's statement that unfamiliarity with the English tongue was a real difficulty with these children. The age of immigration was another factor which was taken into account in this connection. If the child immigrated before it had acquired speech, it was treated as though born in this country. Language was counted as a doubtful cause for a child who immigrated before the development of speech and in whose home only a foreign language was used. Language was not considered, when English in connection with some foreign tongue was spoken in the home.

A "very deficient" grade of conduct was always put into the class of real causes, and a grade that was only "deficient" into the class of doubtful causes, unless its classification among the real causes was warranted by additional information on the back of the blank. All grades of conduct above deficient were not considered.

I have set forth the principal facts which guided me in the classification of causes into real and doubtful. In some cases, however, information which appeared on the back of the blank justified a departure from the rules as laid down above. In the choice of these rules I can not claim to have exercised good judgment before having subjected my results to criticism. Preparatory to this criticism and the presentation of my results, I shall continue my discussion of causes.

As there are fourteen kinds of real causes, like health, conduct, home life, etc., one or all of which are possible in a single case, it happens that their number for different cases varied. For some only one real cause could be found, and for others two, three, or even more. Similarly the intensity of causes varied. For example, vision might be 1/4 normal for one child and only 1/10 normal for another. In addition to this it has been shown that the amount of retardation varies from one year to six and one-half years. When, therefore, the number and intensity of the factors was in my opinion sufficient to account for the whole amount of retardation I called them an adequate cause of the retardation. The number of factors operative to produce an adequate cause for the boys varied from 1 to 9 and for the girls from 1 to 6. The whole number of boys for whom an adequate cause was found, for whose whole amount of retardation the factors found are believed to have been responsible, is 335. The boys for whom 1, 2, 3, 4, 5, 6, 7, 8, and 9 factors were found, are 43, 119, 106, 46, 13, 6, 1, and 1, respectively. The whole number of girls with adequate causes is 321. Given for the different number of factors from 1 to 6, following the same order, they are 42, 140, 80, 42, 15, and 2. The percentage of girls for whose retardation sufficient cause has been found is 68.7 and the percentage for the boys is 62.9. That the percentage for the boys is lower than that for the girls may be wholly or in part accounted for by the fact that the investigation was begun with a large boys' school, where blanks were filled out for 75 cases. The difference, however, is only 5.8 per cent. There is, moreover, a close correspondence between the numbers in the series for the two sexes. The whole number of children for whom there appears to be an adequate cause is 656. This is 65.6 per cent of the number examined.

The whole number of factors for the boys is 900. This gives an average of 2.7 factors for each boy. The numbers for the girls are 817 and 2.6. The average number of factors for the sexes is therefore practically the same.

For the different kinds of causes, however, sex differences appear. It was previously pointed out that the number of girls who were out of school on account of ill health was much larger than the number of boys who were out for the same cause. In confirmation of what was said, the cause of ill health appears 102 times for the girls and only 80 times for a larger group of boys. Nutrition appears 69 times as a cause for the boys and only 42 times for the girls. There are 38 cases of adenoids among the boys and 26 among the girls. Speech defects are almost twice as numerous among the boys as among the girls, the numbers being 32 and 16 respectively. The intensity of visual defect represented under adequate causes occurs 88 times with the girls and only 50 times with the boys, being almost twice as frequent among the girls as among the boys. Hearing defects are practically of equal frequency for the sexes. The number of boys is 25 and for the girls 20.

Of the social causes, entrance, attendance, and language show practically no sex differences. Given in the above order the figures for the boys are 117, 178, and 22 respectively; and for the girls, 117, 188, and 17.

School history, according to the principles guiding me in choosing this as a cause, affects only 69 boys as opposed to 85 girls. This difference can possibly be explained by assuming that the girls remembered their own history better than the boys. According to my results the number of boys coming from poor homes exceeds the number of girls; for the former the number is 138 and for the latter 84. It appears to me most unlikely that the number of poor homes among the boys should exceed the number among the girls. It seems reasonable to suppose that the girls are better cared for by the home than the boys. As the girl is more intimately connected with the home than the boy, she is doubtless more influenced by its discipline. Boys are more apt to be out upon the street where they are under the surveillance of no one. Many public playgrounds, where the boy could spend his leisure hours under the observation of his parents or some officer especially appointed for the purpose, might make him more amenable to home and school discipline.

It has been pointed out that conduct was worse among the boys than among the girls. This is confirmed by the results which were here obtained, there being 41 boys with deficient conduct as opposed to 12 girls. There are 38 boys and 18 girls who are rated as mentally deficient. They include all grades of mental deficiency, from the backward child, or the borderland case, to the idiot. For the groups under consideration the mentally deficient boys are about twice as numerous as the mentally deficient girls. This proportion of deficients is not confirmed by a study of grades of mentality below backwardness, among children not belonging to the thousand retarded cases who were the object of this investigation. Nineteen cases of mental deficiency were found among practically six thousand children. Out of these nineteen cases, only eight were boys and eleven were girls.

It is of interest to observe that, in spite of compulsion by law, attendance is the most frequent cause of retardation. Those of next greatest frequency are late entrance and home life. If all the adequate causes be given in the order of their frequency of occurrence, they are as follows: Attendance 366, entrance 234, home life 222, health 182, school history 154, sight 138, nutrition 111, adenoids 64, deficiency 56, conduct 53, speech 48, hearing 45, language 39, tonsils 5. The total number of social causes is 1015. They appear almost twice as often as the physical causes, which occur only 593 times. It appears to be probable that the social causes are not only most frequent, but also most far-reaching in their consequences. Many of the physical causes would doubtless disappear with the improvement of some of the social causes. (See table VI, appendix). The order also might change for a different group of children or for a different investigator, who might require one or more of the defects or social conditions to be more or less intense in order to rank as a real cause.

In many cases the number and activity of the real causes were, in my opinion, not sufficient to account for the whole amount of retardation. In this event, the real causes, instead of being called adequate, were called contributory factors, *i.e.* they contributed toward a complete or adequate statement of the causes of retardation. A contributory factor might be of the same consequence as an adequate cause. Two cases might have the same number, kind and intensity of real cause, but because they were associated in the one case with one year's and in the other with six years' retardation, they might be an adequate cause in the former and only contributory factors in the latter.

The whole number of cases for whom contributory factors were found is 195, of these 104 or 9.5 per cent are boys and 91 or 19.5 per cent were girls. The relative frequency for each item of the contributory factors is the same as that for the adequate causes. The boys show better health, more speech defects, more acute vision, and poorer conduct and home life than the girls. For the boys, the total number of contributory factors is 119, an average of 1.14; for the girls, 106, an average of 1.16. The social causes again are more numerous than the physical, there being 157 of the former to 58 of the latter. For a detailed distribution of contributory factors the reader is referred to table VI.

Doubtful causes were defined as those of doubtful influence in producing retardation. For the sake of discussion the doubtful causes are sub-divided. When they occur in connection with adequate or contributory factors they are called associated factors; but when they are the only causes possible to discover in one or more cases, they are termed unassociated factors. There are 70 boys and 40 girls with 130 and 75 unassociated factors of retardation respectively. The whole number of doubtful causes is 746 for 509 boys, and 537 for 452 girls. The sex differences pointed out for the real causes are the same for the doubtful causes excepting health, nutrition, hearing, and school history. Hearing, however, will be the only exception if the doubtful and real causes be combined, and for this defect no sex difference was claimed under the real causes because it appeared to be practically equally prevalent for the sexes, affecting 6.8 per cent of the boys and 5.8 per cent of the girls.

The order of frequency of occurrence of the doubtful causes differs considerably from that of the adequate. Given in the order of frequency, they are: Enlarged tonsils 264, home life 190, smoking 87, health 143, nutrition 133, conduct 125, school history 95, sight 83, speech 63, language 59, and hearing 41. The position of smoking in the series was determined upon the basis of the average, because this condition refers only to the boys.

For the adequate causes it was found that the number of social causes was almost twice as large as the number of physical causes, but this relation is more than reversed for the doubtful causes. There are only 344 social as opposed to 814 physical causes. This change is to be explained by the fact that entrance and attendance were excluded from the doubtful social causes and enlarged tonsils and smoking added to the doubtful physical causes.

The total number of doubtful causes found is 1283, and the total number of real causes 1942. As it is less my purpose to point out the number of causes, their relative frequency and sex differences, than to prove that they are real causes of retardation, I shall take up the treatment of the latter and refer to table VI for a more detailed account of the former. At this place, however, the description of a number of cases to illustrate the different kinds of causes may be of service. To this purpose I shall therefore devote the next few pages.

No Causes.

Case I. According to my scheme for the determination of real and nominal causes, none appeared on the record of this boy. He entered school at the age of five years. His present age is 12 years and 11 months; this in connection with the fact that he is in the advanced or A class of the fourth grade fixes the amount of his retardation at two and one-half years. He attends school regularly and makes a fair grade in conduct and progress. Having always attended the same school, he has suffered no loss through transfers. He was reported to have medium mentality; he is healthy and well nourished. His home life is above the average. His parents are of American descent. They speak the English language in the home. Both sight and hearing are normal. There are no physical stigmata, with the exception of a somewhat high palate. The only children's diseases were whooping cough and scarlet fever.

Case II. A girl 17 years and 6 months old. She entered school at the age of five and is now in the advanced class of the eighth grade. The amount of her retardation is three years. At the time her record was filled in, her progress was reported to be good, conduct excellent, and attendance regular. She had attended three different schools, all of which were in the city of Camden. Her mentality is good. She is neither bold nor shy, of an amiable disposition, and alert in her general reactions. Her health, nutrition, and home life are very good. Her parentage is American and the English language is spoken in the home. There are no physical stigmata, but her hand balance is slightly nervous. In her early school years she suffered from measles, chicken-pox, and mumps. Her teacher assigned slow development as the cause of her retardation. I did not succeed in discovering any causes for this case.

DOUBTFUL CAUSES.

Case III. This is a boy who is 13 years old. He is in the lower or B class of the fifth grade and the amount of his retardation is two years. He entered school at the age of six. His attendance is regular, conduct good, and progress deficient. He has never belonged to other than the Camden schools, and has been transferred only once. His mentality is medium. Health, nutrition, and home life are good. His parentage is English, but he was born in Philadelphia. His father is dead. He has an older sister and one younger brother. Vision in the right eye is normal, but in the left only 1/5. Hearing is normal. The palate is narrow and tonsils are enlarged. Mouth breathing is associated with these defects. In this case sight and enlarged tonsils were taken as doubtful causes.

Case IV. A boy aged 14 years and 8 months. He is retarded two and a half years, being in the A class of the sixth grade.

He entered school at the age of six. His ratings for progress, conduct, and attendance are fair, good, and regular respectively. There is nothing in his school history to account for his retardation. His mentality is of medium grade. His health is fair, and both nutrition and home life are good. The English language is spoken by the parents, who are of American descent. Sight and hearing are normal. There is a slight stutter in his speech. The hand balance is somewhat nervous and the palate is high and narrow. Health and defective speech are classed among the doubtful causes.

Case V. This girl is in the B class of the fifth grade and is 12 years and 4 months old. The amount of her retardation is therefore one and a half years. She is reported to make excellent progress, attends school regularly, but her conduct is only fair. She began her school life in Philadelphia at the age of six. Her mentality is very good, health fair, nutrition good, and home life above medium. Her parentage is German, and the German language is spoken in the home. Vision is 10/15; hearing normal; the palate is high. Measles and mumps were the only children's diseases. School history, health, language, and sight appear as doubtful causes on the record of this case.

Case VI. This girl, who is 13 years and 10 months old and is in the B class of the fifth grade, is retarded three years. She entered school at the age of seven. Her progress is fair, conduct good, and attendance regular. She began school in Philadelphia, her native city, and has attended two different schools in the city of Camden. Her grade of mentality is slow, and her health and home life fair. She is well nourished. Her parents are Italians, but they speak the English as well as the Italian language in the home. Vision in the right eye is normal, in the left 8/10. Hearing is normal, there are no physical defects and no diseases excepting measles. She is shy, pleasing in her manner, inert in activity, and appears to be of a reflective type of mind with a firm will. School history, health, and home life are the doubtful causes in this case.

Contributory Factors.

Case VII. The age of this boy is 13 years and 6 months and he is in class B of the fifth grade. The amount of his retardation is therefore two and a half years. He makes fair progress and attends school regularly, but is deficient in conduct. He entered school at the age of eight, which is one year older than the normal age of entrance for this group. He has never attended any but the Camden schools. His mentality, health, and nutrition are good. His home life is above medium grade. Parentage is American, home language English. Both sight and hearing are normal. The palate is high and the tonsils are enlarged. Diphtheria was the only disease. Late entrance was taken as a contributory factor, and conduct and tonsils as associated doubtful causes.

Case VIII. A boy whose age is 12 years and 9 months. He is in grade two, class A. The amount of his retardation is four and one-half years. He entered school at the age of eight. His progress and conduct are deficient, but his attendance is regular. He has always attended the same school. He is a dull child with medium nutrition, a fair home life and good health. His parents are German, but the English language is spoken in the home. Sight and hearing are normal. His hand balance is slightly nervous and there is a stutter in his speech which was rated worse than medium. The children's diseases are measles and whooping cough. In this case late entrance and stuttering were regarded as contributory factors, and home life, nutrition, and conduct as associated doubtful causes.

Case IX. This is a girl 13 years and 7 months old. She is in grade four, class A, and is retarded three years. Her progress and conduct are deficient, but her attendance is very regular. She entered school at the age of six. Mentally she is slow. Health and nutrition are good, home life medium, parentage is English. She lives with her mother, her father being dead. Her mother keeps a store, in which the girl works before and after school. Vision is normal; hearing is normal in the right ear, but so defective in the left ear that she could not be tested with the audiometer. Her palate is very high and her speech is defective. The speech defect is a stammer, one grade better than medium; children's diseases are measles and mumps. Hearing is a contributory factor and home life, conduct, and stammering associated doubtful causes.

Case X. A girl aged 12 years and 6 months. She is in grade three, class A. Her retardation is three years. She has made very deficient progress, having missed the last two promotions. Her conduct is rated as deficient, but as she is a moral case, conduct was regarded as a real cause. She entered school at the age of seven and attends very regularly. Her mentality is dull, health good, nutrition fair, and home life poor. Home life is therefore another real cause. Her parents are German and they speak the

German language exclusively. The birthplace of the child is Camden. Her sight and hearing are normal. The tonsils are enlarged and the voice is nasal. The children's diseases are measles, mumps, chicken-pox, diphtheria, and scarlet fever. Conduct and home life appear as contributory causes in this case; the associated doubtful causes are nutrition, enlarged tonsils and language.

Adequate Causes.

Case XI. This is a boy who is retarded one year, being 9 years and 7 months old and in the A class of the second grade. He entered school at the age of seven. His progress is fair, conduct good, and attendance regular. He attended only two different schools, both of which were in the city of Camden. His mentality, health, and nutrition are good; home life is medium, parentage German. The parents speak the German language exclusively. This boy was born in Germany. In this case the principal of the school reported that unfamiliarity with the English language had been a bar to his progress. Vision 8/10 R; 10/10 L; hearing normal. There are no physical defects and no diseases. As this case was retarded only one year it was thought that language might reasonably be considered as the sole cause of his retardation. Home life was taken as an associated doubtful cause.

Case XII. The amount of this boy's retardation is one and one-half years. He is 13 years and 6 months old and is in grade six, class B. He entered the Camden schools at the age of six. He also attended the schools of a rural district for a period of two years. His progress is fair, conduct deficient, and attendance irregular. His mentality is of medium grade. Health and nutrition are good and home life is above the average. Parentage is American. Sight and hearing are normal. The tonsils are enlarged and the voice is obstructed. The diseases are measles, chicken-pox, whooping cough, and mumps. This boy confessed that he smoked the pipe. He is bold, surly and stubborn. Attendance and school history were considered adequate causes, and conduct, smoking and enlarged tonsils doubtful causes.

Case XIII. A boy aged 11 years and 8 months. He is in grade three, class B, and is retarded two and a half years. He entered school at the age of eight and attends very regularly. His conduct is good and progress fair. There has been nothing in his school history to retard his progress. He has medium mentality. His health is poor and his nutrition medium. He is a smoker. Home life is poor; parentage American; language English. Sight and hearing are normal. Stammering is below medium. His diseases are measles, mumps, whooping cough, and pneumonia. Health, home life, stammering, and entrance are taken as adequate causes; smoking as an associated doubtful cause.

Case XIV. The age of this boy is 13 years and 6 months. He entered school at the age of nine years and is now in grade four, Class A. The amount of his retardation is three years. His progress is very deficient. He is, no doubt, a case of promotion on the merit of age. His conduct is good and his attendance regular. He has always attended the same school. He is a mentally deficient case of the backward grade. His health, nutrition, and home life are good. He lives with his parents, who are of American descent. His sight and hearing are normal. The hand balance is nervous and the palate is high. He has suffered from mumps, pneumonia, and spinal meningitis. He still complains of headache and vomiting. Mentality and age of entrance were taken as adequate causes of his retardation. His deficient mentality is doubtless due to physiological conditions produced by spinal meningitis. A sister of this boy died of the disease.

Case XV. A boy aged 13 years and 7 months, is in the third grade, class A. He is, therefore, retarded four years. He entered school at the age of seven. His progress is deficient, conduct good, and attendance regular. He was never transferred to other schools; his mentality, health, and nutrition are good. Home life is poor; the parents are Italians who speak their native tongue exclusively. Vision is 8/10; hearing normal. There are no physical defects and no diseases. Late entrance and home life are the adequate causes. As the birthplace of this boy was Philadelphia, and there was no positive evidence that language retarded him, language was taken as a doubtful cause. The teacher assigned lack of application as one of the causes.

Case XVI. A boy 14 years and 6 months old. He is in grade one, class A. The amount of his retardation is seven years. He entered school at the age of nine and has never been transferred. His progress is very deficient, conduct is excellent and attendance irregular. He is mentally deficient, belonging to the class of idiots. His muscular co-ordination is very bad,—he is unable to write legibly; he walks with difficulty, and stutters and stammers badly. He has a poor memory and is unable to tell a connected story. He can do practically no school work. His health is poor, nutrition fair, home life poor. He was born of American parents and has one older sister, who attends to the household duties, the mother being dead. It was difficult to test his sight and hearing, but both appeared very deficient. He showed mouth breathing, a V-shaped palate, enlarged tonsils, and a number of other signs usually associated with adenoids. His cranium is small and there are marked stigmata of degeneration. I was unable to obtain any history of diseases. In this case the following nine real causes were found: attendance, entrance, mentality, health, sight, hearing, adenoids, speech, and home life. In connection with these nutrition appears as a doubtful cause.

Case XVII. This is a girl 12 years and 6 months old and in the B class of the fourth grade, her retardation being two and a half years. Her progress is fair, conduct good, and attendance very poor; she is absent about one-half of the time. I was unable to obtain her age of entrance. She attended a parochial Catholic school for a period of four years. She also belonged to the Philadelphia public schools. Mentality is good; health and nutrition fair; home life above medium. Parentage is mixed, the father being of American and the mother of Irish extraction. Sight and hearing are normal. The enlarged tonsils are associated with a sullen disposition. The diseases are measles and whooping cough. Attendance and school history are taken as the adequate causes, health, nutrition, and tonsils being associated factors.

Case XVIII. This is another girl whose retardation is two and a half years. She is in the second grade, class B, and is 10 years and 7 months old. She entered school at the age of nine and attends very regularly, but her conduct is deficient and her progress very deficient. Her school history is free from retarding causes. Her mentality is slow, health good, and nutrition very good. Her home life is fair. She was born in Italy of Italian parents who speak only their native tongue. The teacher assured me that language was a retarding cause. Vision is 10/20; hearing 82 R; 60 L. A very narrow palate, enlarged tonsils, mouth breathing, reduced hearing, abnormal sight, a dull expression, and a short upper lip led to the diagnosis of adenoids. The children's diseases are measles, mumps, chicken-pox, and scarlet fever. Adequate causes are late entrance, language, sight and adenoids. Doubtful causes are home life, conduct, and hearing.

Case XIX. A colored girl 15 years and 7 months old. She is in grade five, class B; hence is retarded four and one-half years. She entered school at the age of seven, but her attendance is very irregular, only about four-fifths of the time. Her conduct is good, but her progress is very deficient. She attended school in four different cities. Her mentality is medium. Her health, nutrition, and home life are good. As her father is dead, she lives with her mother, who works out. Vision is 10/20 with glasses, 1/20 without glasses; hearing normal, tonsils enlarged. The diseases are whooping cough and measles. Attendance, school history, and sight are adequate causes and enlarged tonsils an associated factor. Factors like deprivation of parents are treated under the head of miscellaneous.

Case XX. This is a girl 16 years and 1 month old, who is retarded seven and a half years, being in grade 2, class A. She entered school at the age of eight. There is nothing in her school history to retard her progress, which, nevertheless, is very deficient. Her conduct is excellent and her attendance very regular. She is mentally deficient, of the idio-imbecile grade. Her health is fair, but on account of physical stigmata, like excessive nervousness, deformed palate, low forehead, small cranial circumference (nineteen inches), and external strabismus, health was regarded as a real cause. Her nutrition is medium, and home life above the average. Her only brother is also mentally deficient. She was born of Jewish parents. The home language is Yiddish. Vision was tested with the illiterate card and was found to be 16/30. Hearing normal. She speaks with difficulty, and has a pronounced stammer. The adequate causes for this case are entrance, mentality, health, sight, and speech. Language is an associated doubtful cause. The number of cases with decided physical stigmata was small: hence I made no separate class for them.

After having gone over the 1000 records and marked upon each one all the real causes to be found, according to the rules which I had laid down as the distinguishing marks of such causes, I found that real causes were noted in 851 of the 1000 cases. I further found that there were 110 cases with unassociated factors, *i. e.* doubtful causes not associated with real causes. There remained, therefore, 39 cases for which no causes appeared. Consequently it follows, if the assumed causes of retardation are real, if there is any connection whatever between causes and retardation, that the children for whom no causes could be found will decrease in number with an increase in the years of retardation. It will further be true if the unassociated factors have no connection with retardation, that the number of children for whom unassociated factors were found will not increase as the years of retardation increase. If the two principles just set forth can be proved, it must follow that the number of children for whom real causes were found (among the 851 cases) must increase with the amount of retardation. I made my calculations for the boys and girls separately, but as the numbers are small, I combined the figures for the two in the final result. Similarly I first computed for years and half years, but for the final result I combined the years with the half years, for the same reason that I combined the sexes. To this method I adhered for computing all the tables that follow. In the text I shall make mention of the final results only, but in the tables the calculations will be given in full. In order to avoid needless repetition, the number of years of retardation will not be mentioned in connection with every series of figures. The first figure in the series will always correspond to one year's retardation, the second figure to two years' retardation, the third to three years, and so on to the fifth year, which was taken as the maximum amount of retardation for the final series.

Distributed among the different periods of retardation, 1, 2, 3, 4, and 5 years, it appeared that 11, 15, 11, 2, and 0 were the number of children for whom no causes were found. By distributing the whole number of cases in the same way the series 129, 385, 323, 123, and 40 was obtained. Dividing the figures in the first series by their corresponding figures in the second the results will be 8.5, 3.9, 3.4, 1.6, and 00. These figures represent the percentage of cases for whom no causes were discovered, for each of the periods of retardation. It will be observed that they decrease with the increase in the years of retardation, and therefore that our first supposition has been proved.

For each of the several periods of retardation, from the shortest to the longest, the number of cases with unassociated factors is 21, 55, 27, 7, 0. By treating them in the same way as the number of cases for which no causes were found, the following series of percentages will result: 16.3, 14.3, 8.4, 5.7, and 0. They stand for the percentage of cases with unassociated factors and form a descending series with the ascending series of years. Hence the second supposition is true. The first and second assumptions having been shown to be true, the third follows without calculation. It will be given below.

The number of cases with real causes for each of the different periods of retardation is 97, 315, 285, 114, and 40. By finding their percentage of the whole number of children for each of the several periods of retardation, the following series will be formed: 75.2, 81.8, 88.2, 92.7, and 100.0. This series increases with the amount of retardation according to the supposition. (See table VII.) Practically the same proof of the relation between real causes and retardation may be cast into a somewhat different form. It may be assumed that the average retardation for the cases with no causes and unassociated factors should be less than the average retardation of the cases with real causes, if retardation is a function of the real causes.

Calculated in years and half years, the total retardation of the 39 cases for whom no causes were found is 91.5 years. The average will therefore be 2.35 years. The total retardation of the 110 cases with unassociated factors is 262.5 years, and the average 2.39. For the 851 cases with real causes the total retardation in years is 2453, and the average 2.88. The average amount of retardation of the cases with unassociated causes exceeds that of the cases with no causes by .04 of a year, and the average amount of retardation of the cases with real causes is .49 of a year more than that of the cases with unassociated causes, thus offering proof of the reality of the real causes. Perhaps it will be thought that these differences are small, but it must be remembered that this is partly due to the fact that the number of children with a high retardation is much smaller than the number of children with a low retardation, and this reduces the averages. If the number of children were evenly distributed among the several years of retardation the differences would be greater. (Table XII.) The above proof may be worked out more in detail by supposing the average retardation to increase with the number of causes. It will be remembered that all the real causes that could be discovered in each of the records,—this choice being made with strict uniformity according to rules already discussed,—were noted, whether the degree of retardation was one or five years. If now there is a connection between the number of causes noted and retardation, then we should expect that for the cases for whom only one or two causes of retardation could be found (with certain obvious exceptions), the average amount of retardation would be less than for the cases for whom more causes were found. If this be true then retardation is a function of the number of causes noted. In collecting the data, the cases with contributory factors were not distributed among the several years of retardation in series composed of the different numbers of causes, and therefore they will have to be excluded from the real causes in this computation. Because the numbers were small this distribution was not made. Could they have been treated, however, with the other real causes, the adequate causes, in this connection they would simply add to the proof, as will appear from table VIII.

The supposition is that if the average number of years of retardation increases with the number of causes found, retardation is a function of these causes. The highest number of causes found in any one case was nine, but as the number of cases with 5, 6, 7, 8, and 9 causes is very small, they will all be included in the groups with five causes. The series representing the total amount of retardation in years, corresponding to the order of causes from one to five, is 190, 687.5, 571, 299, and 146; and the number of cases for each period of retardation is 85, 259, 186, 88, and 38 respectively. Calculating the average amount of retardation in years, the following will be obtained: 2.24, 2.65, 3.07, 3.40, and 3.84. The series increases with the number of causes, and thus retardation is a function of them. (Table XII.)

The relative and absolute value of the real and doubtful causes may be tested by still other suppositions. I shall begin with unassociated factors. If unassociated factors are connected with retardation their number should increase with the increased retardation. The unassociated factors corresponding to each of the different years of retardation are 48, 100, 45, 12 and 0; the cases with unassociated causes are 21, 55, 27, 7 and 0. Dividing the number of causes by the corresponding number of children in each case, the following series of average number of causes will be produced: 2.28, 1,82, 1.67, 1.71, and 0.00. The series is descending while the amount of retardation is ascending. Hence the supposition is not warranted. (Table VIII c.)

By making the same supposition as above in reference to the combined associated and unassociated factors, the value of all the doubtful causes may be shown. Three series of causes, cases, and averages may be given at once. Following the order indicated they are 192, 493, 386, 164 and 48; 118, 370, 312, 121, and 40; 1.63, 1.33, 1.24, 1.36, and 1.20. The nature of the series justifies the same conclusion as for unassociated factors. (Table VIII c.)

A treatment of the contributory factors according to the last supposition and method will yield the following series: Factors, 17, 87, 82, 32, and 7; cases, 16, 80, 70, 24, and 5; averages, 1.06, 1.09, 1.17, 1.33, 1.40. As the series of the average number of factors increases regularly with the amount of retardation, the assumption that the contributory factors are real causes of retardation is justified. (Table VIII c.)

For the adequate causes the series are: Causes, 153, 548, 606, 280, and 130; cases, 81, 235, 215, 90, and 35; averages, 1.89, 2.33, 2.82, 3.11, and 3.71. The series of averages for the adequate causes is a better series than the one for the contributory factors. This may show that they are more efficient in producing retardation than the contributory, but it must be observed that the numbers are much larger for the adequate than for the contributory factors, and on this account a better series is to be expected. (Table VIII c.)

I have also calculated series for various combinations of causes. In the text only the series representing the average number of causes will be given. By a combination of contributory and adequate causes, a series of averages for all the real causes will be obtained. The series is as follows: 1.75, 2.02, 2.41, 2.70, and 3.43. (Table VIII c.)

The next series will show how the average number of contributory and associated factors increases with the amount of retardation. All the causes, both real and doubtful, found in the cases under consideration are represented in this computation. The series is 2.44, 2.29, 2.40, 2.96, and 3.20. (Table VIII c.)

By combining the adequate causes with all their associated factors in the same manner as explained for contributory factors, the following series will be obtained: 3.40, 3.59, 4.00, 4.37, and 4.83. (Table VIII c.)

The next set of averages is obtained by a combination of real causes and associated factors. All the cases except those with unassociated factors and those for whom no causes were found are involved in the calculation of this series. It is as follows: 3.24, 3.26, 3.61, 4.08, and 4.60. It appears, therefore, that in spite of the unfavorable influence of doubtful causes, the series remains unbroken and stands as evidence of the fact that the causes which at first were assumed may now be regarded as real. (Table VIII c.)

The objection may be made that the series given above do not ascend as rapidly as one would expect. To this it may be replied that the work is of a statistical nature, and that the number of s is not sufficiently large to eliminate the disturbing effect of errors. Moreover, it has been found that the average age of the children increased with retardation. The average age of the boys who are retarded 5.5 years is 3.7 years more than the average age of those who are retarded one year. For the girls the difference between the average for 1 and 5.5 years retardation is still larger, being 5.3 years. The average age increases regularly with retardation for both the boys and the girls. It may be seen from the following series that although several of the consecutive numbers are alike, not a single break occurs:

Years of Retardation	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5
Boys' Average Age,	11.0	11.9	12.2	12.9	13.2	13.6	13.7	14.1	14.1	14.7
Girls' Average Age,	10.8	11.9	12.4	13.1	13.5	14.1	14.1	14.1	14.8	15.6

On account of the increase of age with retardation, it seems fair to assume that the larger the amount of retardation the longer time the causes had to produce it, and that therefore it is not necessary that their number and average should multiply rapidly with increased retardation. (Table IX.)

As the number of cases is small and the kinds of causes numerous, it is not to be expected that series with any degree of regularity can be obtained from a separate treatment of the causes. Especially is this true because the cases distribute themselves so unevenly among the different years of retardation. For two years' retardation there are 315 cases with real causes and for five years only 40 cases. In spite of these difficulties I have been able to compute fairly symptomatic series for the three groups of social, physical, and psychical causes. Doubtful causes were excluded from the calculations. The social causes are most numerous and consequently give the most regular series. The number of causes for each of the different years of retardation is 102, 398, 408, 185, and 79, and the corresponding cases are 97, 315, 285, 114, and 40; the series of average number of social causes is 1.05, 1.26, 1.43, 1.62, and 1.98. The total number of real social causes is 1172. The real physical causes are 651, only about one-half as many as the social causes. In spite of the small number, the series of averages for the physical causes, with a single exception, ascends quite regularly with the amount of retardation. The series is .65, .65, .82, .89, and 1.20. The series for the psychical causes, conduct and mental deficiency, is .05, .10, .16, .23, and .25. (Table X.) This progression is surprisingly regular in view of the small number of cases. It may be attributed to the mentally deficient cases. If a series be computed for them only, an unbroken progression will result. The total number of mentally deficient cases of all grades from backwardness to idiocy is 56. These distribute themselves as follows among the several years of retardation: 1, 11, 23, 15, 6. If all the cases with real causes, yielding the series, 97, 315, 285, 114, and 40, be used for the purpose of converting the series into one of percentages, the following regular progression will be obtained: 1.0, 3.5, 8.1, 13.2, 15.0. (Table XIV c.)

Making use of the symbols described in the blank, the table below will show the grade distribution of the 56 mentally deficient cases. All cases which it was thought belonged more properly to a class of borderland cases between the mentally normal and the mentally deficient were grouped among the best grade of mentally deficient.

	Bkw	IH	IM	II	Id	Totals
Boys	34	2	1	0	1	38
Girls	16	1	0	1	0	18
Totals	50	3	1	1	1	56

From this table it will appear that the number of imbeciles found among the one thousand children is 6 or .6 of 1 per cent. I examined about three-fifths (6000) of the children attending the Camden schools for mentally deficient cases in addition to my list of retarded children. Among them I found 19 imbeciles. To these three-fifths of the 6 belonging to the retarded group should be added, making about 23, or almost .4 of 1 per cent. The percentage of imbeciles for the retarded group is therefore higher than for a group of children taken at random. Perhaps some of the 19 imbecile children would more properly have been classed as backward cases, but in my opinion all of them would have fared far better had they been at an institution for mentally deficient children. The grading of the 19 cases appears in the accompanying table:

	IH	IM	II	Totals
Boys	4	3	1	8
Girls	6	3	2	11
Totals	10	6	3	19

In treating mentality as a cause of retardation, I did not consider the cases which were reported by the teachers as slow and dull, to show a lack of capacity for school work. This was done because it was thought that the degree of mentality which is usually termed dull or slow might simply be a result of other causes. As there are only 334 dull and slow children in the whole retarded group, it is evident that not only slow and dull children are retarded. The percentage of such children, however, appears to increase with the amount of retardation. If they be distributed among the different years of retardation, the series 24, 123, 119, 49, and 19 will be obtained. The series for the whole number of children is 129, 385, 323, 123, and 40. The percentage, therefore, of the whole number of children for each of the several years of retardation will form the following sequence: 18.6, 31.9, 36.8, 39.8, and 48.0. From this series it appears that the number of slow and dull children increases rapidly and regularly with the amount of retardation. (Table XI.) A further study of the cases the teachers called slow and dull showed that their physical causes were practically as numerous as for those of better grade of mentality (leaving out of account the mentally deficient). For the slow and dull group the average number of physical causes is .67, and for the other group .64. For the boys and girls separately the figures are .63 and .61, .72 and .69 respectively. If all the real causes be considered, they will average 1.94 for the slow and dull group and 1.94 for the other group. The two groups, however, show a decided difference in the amount of retardation, that of the former being 3.00 years and of the latter 2.71 years. The figures for the different sexes are practically the same. A still further study of slow and dull cases showed that the percentage of first-born among them was 19.8, while the percentage of first-born among the other cases, excluding the mentally deficient, was only 16.7; also that the percentage of first-born among the mentally deficient was 28.6. This fact was shown by both sexes. Further light was thrown upon slow and dull children, including mentally deficient, by finding that 52.3 per cent of them were also called stolid or inert, while only 21.5 per cent of the other children were called inert. This striking difference appears for both sexes. Many children might lose their apparent dulness if quickened by proper physical exercises. Teachers frequently complain that some days children are exceptionally dull. At such times it appears to me they should indulge in physical exercises until they show some capacity for acquiring the three R's.

In order to obtain additional evidence of the relation between social causes and retardation, I correlated the extent of retardation of school districts differing in social grade, with the average enrolment for the districts. They were graded into five classes, in addition to the negroes. The 2003 retarded children when distributed among the different grades from the highest to the lowest (including negroes as the lowest grade) formed the series 116, 357, 515, 612, 163, and 240. The average enrolment distributed in the same way gave the following series: 708, 1846, 2780, 3063, 710, and 645. Therefore, the percentage of children retarded in each one of the districts from the best to the poorest grade is 16.3, 19.3, 18.6, 19.3, 22.9, and 37.2. The fourth, third, and second grades show practically no difference in the number of retarded children. But the fifth and first show a difference of 3 and 3.6 per cent respectively; while the colored schools average almost twice as many retarded children as the other schools. The results might have proved to be more symptomatic had the several school districts been composed of more homogeneous groups in respect to social standing. (Table XIII.)

Having treated the real causes in groups of social, physical, and psychical, we may now turn to a consideration of the individual causes in these groups. In this connection I wish to repeat that the number of cases for which real causes were found is small, being only 851, and the kinds of causes are many; therefore it must not be expected that the percentage of cases with one kind of cause increases as retardation with any degree of regularity. Especially is this true because the 851 cases distribute themselves very unevenly among the several years of retardation.

The method of treating the individual causes is precisely the same as that employed for the different groups. As, however, only one kind of cause is considered in a single table, the final series will not be one of average number of causes, but of the percentage of children for whom the cause was found. Thus as there were 97 children retarded one year for whom real causes were found and only 13 of these had poor nutrition, the percentage of children who were retarded one year and had nutrition as a real cause is 13.4. Real causes were found for 315 children whose retardation was two years. There were 28 of these who had poor nutrition. Therefore, of the children who were retarded two years 8.9 per cent had faulty nutrition as a real cause of retardation. The percentage for the children who were retarded three, four, and five years was calculated by the same method. The method set forth for nutrition is the one employed for the treatment of all the other individual causes. The complete calculations appear in table XIV. At this place I shall give only the contrasted series in the order of frequency of the causes, the most frequent first.

From a glance at table XIV it will appear that the series of percentages is regularly ascending with the amount of retardation for only entrance, attendance, home life, and mental deficiency. It follows, therefore, that the series for all the causes, except mental deficiency, is broken when their number falls to 200 or less. The absolute and relative importance of the individual causes of retardation could be tested in a way by the above method, if the number of cases investigated were 10,000 instead of 1000. Were the number of cases sufficiently large, a test could be made, not only of the value of individual causes but even of the different grades of these causes.

There are a number of causes which it was thought well to treat individually, either because no attempt had been made to collect from all the children data pertaining to these causes, or because the data were sufficiently numerous to warrant a separate consideration. In some cases, moreover, there was such indecision as to the real value of the data that separate treatment seemed preferable. On account of their variety of character they may be subsumed under the heading of miscellaneous causes.

I shall first turn to the relation between smoking and the amount of retardation. The method of correlation is the same as that used in the preceding tables. The cases who smoke were first distributed according to their occurrence among the several years of retardation. Similarly were all the boys of whom the information was sought. The next step was to find for each year of retardation the ratio of the number of cases smoking to the number of cases asked for these data. In this way a series of ratios or percentages was obtained which showed whether or not the number of boys smoking increased with the amount of retardation. The determinations were first made for years and half years, but the half years were then combined with the years to make the series of percentages more regular. I shall give here only the series for which the years and half years were combined, the first number in a series corresponding to one year's retardation and the second number to two years' retardation, and so on. The series for the number of cases smoking is 7, 24, 31, 17, and 8; for the whole number of boys asked the series is 74, 183, 164, 70, and 23. By means of these series the percentage of boys who smoke may be calculated for each year of retardation. These percentages will produce the following progression: 9.5, 13.1, 18.9, 24.3, and 34.8. The series is highly symptomatic of the injurious effects of smoking upon the boy's school progress. If this series really stands for what it seems to indicate, the assumption that smoking was merely a doubtful cause is false. By asking the boys whether they smoked cigars, cigarettes, or a pipe, I learned that only a very few smoked cigars, and that those who smoked a pipe were almost as many as those who smoked cigarettes. As nearly as I could determine, the boys who smoked cigarettes smoked more constantly than those who smoked a pipe. It is quite likely that the boy can stand the smoking of bleached cigarette tobacco much better than the relatively stronger pipe tobacco. If the cigarette injures the boy more than the pipe or cigar, it is because he indulges more excessively in smoking the cigarette. (Table XV.)

The next series of percentages is intended to show the correlation of the number of cases drinking tea and coffee, with the amount of retardation. The calculations were made in the same way as those for smoking. As the cases for this cause were boys and girls, the series were first determined for the different sexes, but the series given in the text represent the combination of the sexes. The series of cases is 49, 196, 167, 61, and 12; of all the children asked 76, 275, 227, 82, and 26; of percentages 64.4, 71.3, 73.6, 74.4, and 46.1. This series is slightly symptomatic of the injurious effects of tea and coffee drinking before the fifth year is reached; here there is a sudden drop which it is difficult to explain. Perhaps the number is too small to eliminate the bad effects of errors. Or it may be that many of these children were forbidden the use of tea and coffee on account of ill health, the percentage of ill health for this group being much higher than that of any other group. (Table XVI.)

By correlating the amount of retardation with the cases who reported that they ate poor breakfasts, a negative result was obtained. The three series given in the order of cases, whole number of children, and percentage are as follows: 22, 75, 70, 22, and 7; 76, 275, 227, 82, and 26; 28.9, 27.2, 30.9, 26.8, and 27. Three numbers of the last series are nearly alike and there is a difference of only 4 per cent between the highest and lowest. (Table XVI.)

Of the one thousand cases there were 234, 23.4 per cent, who were deprived of one or both parents either by death or separation. This percentage seems to be excessive, but on account of insufficient data no comparison can be made with the children of normal age for their grade. The relation of deprivation of parents to the amount of the child's retardation can however be tested as above, by a correlation of the number of cases deprived, with the amount of their retardation. The series for the cases deprived is 23, 89, 79, 32, and 11; for the whole number of children 129, 385, 323, 123, and 40; and the series of percentages is 17.8, 23.1, 24.4, 26.0, and 27.5. This succession of percentages shows a regular increase of cases deprived of parents in proportion with the amount of retardation. As adequate cause for the retardation of 670 cases has already been found, it would appear that the finding of additional causes is a denial of the adequacy of the causes assumed to be so. In this there may be some truth, for it was wholly a matter of judgment whether the causes were adequate to produce a given amount of retardation. In this connection, however, it must be remembered that some of the causes here treated, like deprivation of parents, lie back of some of the causes already considered. Thus deprivation of parents lies back of home life. Of the 234 cases deprived of one or both parents, 86, or 37 per cent, were reported to have a poor home life, of the grade described in the preceding pages. Many of these causes may also refer more especially to the cases for whom no adequate causes had in my opinion been found. (Table XVII.)

It has already been shown (table IX) that the average age of the children increases with the amount of retardation. The above series shows that the number of cases deprived of parents increases with the amount of retardation. Consequently it follows that both age and the cases deprived of parents increase with the amount of retardation. It appears, therefore, to be a logical necessity to have the number of cases deprived of parents increase with age, and if this be so then it is only reasonable to suppose that deprivation of parents is a function of age and has no connection whatever with the amount of retardation. As it is only the average age which increases with the amount of retardation, it is not a necessity for all the oldest children to be most retarded nor for all the youngest to be least retarded. From table IX it appears that there are some children 14, 15, 16, and 17 years of age who are retarded only 1, 1.5, 2 and 2.5 years respectively, while there are children only 10, 12, and 13 years of age who are retarded 3.5, 5, and 5.5 years. From anything that has thus far been said it is therefore not necessary for the number of cases deprived of parents to increase with age; and upon making a correlation of age with the number of cases deprived of parents, a series is obtained which shows that the number of cases deprived does not increase with age. There are 17 cases who are 9 and 10 years of age; 61, 11 and 12; 110, 13 and 14; 42, 15 and 16; and 4 cases who are 17 and 18. The whole number of children corresponding to each of the several ages from the lowest to the highest is 67, 305, 426, 169, and 33. Giving the former series in terms of the latter, we obtain the following series of percentages: 25.4, 20, 25.8, 24.9, and 12.1. This series indicates that the number of cases deprived of one or both parents decreases rather than increases with age, consequently the series showing an increase of the number of cases deprived with the amount of retardation, is symptomatic of a relation between the two. (Table XVIII.)

From calculations given below, it appears that first-born children are more apt to be retarded than others. The number of boys examined in this investigation is 533. We may assume that they represent so many families, although the number is somewhat less. The whole number of children both living and dead, for the assumed 533 families is 2856. Among these therefore we may expect 533 first-born children. If we can expect 533 first-born among 2856 children, then among 533 the number to be expected is 100. In reality the number is less than 100 because the number of families is less than 533. Sometimes two or more children came from the same family. In the same way it was found for the girls that 84 first-born may be expected among 467 families with 2603 children. By actually counting the number of first-born among the 533 boys and 467 girls, they were found to be 124 and 122 respectively. This is an excess of 24 with the boys and 28 with the girls. The excess would have been exaggerated had the thousand boys and girls actually represented so many families.

In this connection it is interesting to observe that the percentage of first-born is higher among the mentally deficient than among the mentally normal. Of 38 mentally deficient boys 11 or 28.4 per cent are first-born, but of 495 normal boys there were only 113 or 22.8 per cent who were first-born. In the same way it was found that 27.8 per cent of the mentally deficient girls but only 23.8 per cent of the mentally normal girls were first-born. The number of first-born among the whole number of mentally deficient cases exceeds the number among the mentally normal by 5.3 per cent, and the number of first-born among this retarded group exceeds the number to be expected by 52.

From the results obtained in reference to first-born children one might be inclined to suppose that their number would increase with the amount of retardation, but the final series showing this relation does not confirm this presupposition. The series is 32.8, 23.4, 22.0, 19.5, and 22.5. This is somewhat indicative of a decrease in the number of first-born with the amount of retardation.

An attempt was made to study the effect of large families upon the amount of retardation by correlating it with the number of living brothers and sisters. It was found that the 129 cases who were retarded one year had 387 sisters and brothers, and that the 385, 323, 123, and 40 cases who were retarded 2, 3, 4, and 5 years respectively had each 1244, 1057, 441, and 139 sisters and brothers. The average number of sisters and brothers from one to five years of retardation forms the following series, 3.00, 3.23, 3.27, 3.58, and 3.48. Here, therefore, there is some indication that large families favor retardation. It may be, however, that large families are associated with some other cause, like home life, which might be responsible for the retardation. Where one event may be dependent upon a large number of events it is difficult to determine which is the real cause or to determine their relative value should there be more than one. (Table XVII.)

The number of cases for the different years of retardation had also a number of dead sisters and brothers. Distributed among the years of retardation from 1 to 5 they form the following series: 99, 442, 411, 175, and 73. The series of averages is 77, 1.15, 1.27, 1.42, and 1.83. This series indicates an increase in the number of dead sisters and brothers as the amount of retardation increases. In making this correlation it was thought that the number of dead children in different families was a measure of their relative viability. The larger the number dead the less would be the viability. It was further assumed that the less the viability the greater would be the amount of retardation. If the number of dead children in a family is a measure of its viability, then it has been shown by the above series that viability decreases as the amount of retardation increases. (Table XVII.)

Several objections may be made to the above series of averages. It may be said that as the size of families increases with the amount of retardation, one may expect the number of dead to increase in the same way. But the increase of the former is broken in regularity while the latter is not. Moreover, by taking the difference between the lowest and the highest average for the living sisters and brothers, and averaging it for the five years, the result will be only .116, but for the dead sisters and brothers the average difference is .212, almost twice as large. Again, as the numbers in the latter series are only half the size of those in the former we should expect the reverse to be true.

Against both series the same objection may be made as was urged against the series showing the relation of deprivation of parents to the amount of retardation. It is likely that the older the children the larger the number of dead sisters and brothers. As the average age increases with retardation, the increase of dead sisters and brothers may be simultaneous with the amount of retardation and age, but in reality be a function of the latter. To determine whether this was true, a correlation was made between the age of the cases and the number of their dead sisters and brothers. The number of cases 9 and 10 years old is 67; 11 and 12 years 305; 13 and 14, 426; 15 and 16, 169; and 17 and 18, 33. The number of dead sisters and brothers for each of the number of cases is 71, 382, 515, 190, and 42 respectively. From these series the following series of averages is obtained: 1.06, 1.25, 1.21, 1.12, 1.27. Perhaps this series shows a slight increase of the average number of dead with the increase of age. But it by no means accounts for the far more rapid and regularly ascending series, which shows the relation of the number of dead sisters and brothers to the amount of retardation. (Table XVIII.)

Usually much of the retardation in the public schools is ascribed to the attendance of a foreign population. I have therefore made an accurate calculation of the average amount of retardation for each of the several races represented in this investigation. The calculation was made by multiplying the amount of retardation in years and half years by the number so retarded. The sum of these products was divided by the whole number of the race for which the computation was made, to obtain its average amount of retardation.

The races whose representation was sufficiently large for individual treatment will be given in the order of the amount of their average retardation, beginning with the one having the highest average. Italian, 3.15 years; negro, 2.96; mixed parentage, 2.86; total non-American, 2.84; all races not treated individually, 2.82; American, 2.79; German, 2.62; English, 2.36. The number of children for each of the different races given in the above order is, Italian, 39; Negro, 112; mixed, 73; total non-American, 367; all races not treated individually, 44; American, 633; German, 78; English, 21. These numbers may be too small to base any conclusions upon them, but if the results obtained be considered reliable, then it follows that the foreign population on the whole increases the average amount of retardation by only .05 of a year. The facts would be stated more accurately, if it were said that some foreign races had a tendency to raise the average amount of retardation, while others reduced it. The Italian and the Negro are most retarded, and the German and English the least. (Table XIX.)

Much retardation is undoubtedly due to a curriculum which aims at making a man out of the boy before he is ready to be a man. The school in its methods and course of study must recognize the interest of the boy as a boy, if it would keep him for the sake of instruction. The school has certainly failed to interest the subjects of its endeavor, and therefore it has become necessary for the state to legislate upon this problem, and pass compulsory attendance acts. In the state of New Jersey the child is unable to leave school before its fourteenth birthday. From this it follows that there is a continual increase in the number of retarded children until the fourteenth birthday, when there is a sudden drop and the series for retarded children decreases to the eighteenth birthday. By taking all children as 9, 10, 11, etc., who are in their ninth, tenth and eleventh years respectively, and distributing the thousand cases of retarded children according to their several ages, the following ascending series is obtained from 9 to 13 inclusive: 35, 97, 133, 200, and 253; then when the thirteenth year has been completed there is a drop from 253 to 149, the number 14 years of age, and the series is decreased. The whole series after the thirteenth year is 149, 81, 33, 15, and 4.

In the chapter on elimination or withdrawals, it was pointed out that by far the largest number of boys and girls leave school to work or stay at home. Real poverty plays a very small part in elimination, there being only 3 out of 420 cases. I think it fair to say that most of the children who leave the elementary grades do so because they are not interested in the work of the school. Parents do not compel, they permit them to go to work. (Table XX.)

The average amount of retardation increases with the age, having practically reached its maximum at the age of 14, when it is 3.2 years for the boys and 2.9 years for the girls. These would no doubt be the points of maximum retardation had not the nearest birthday been taken to make the computations. The series of average retardation for the boys and girls from the 9 to the 18 years inclusive are as follows:

Age	9	10	11	12	13	14	15	16	17	18
Boys	1.4	1.6	2.3	2.7	2.9	3.2	3.4	3.2	3.6	4.7
Girls	1.6	1.8	2.1	2.7	2.9	2.9	3.3	3.2	3.4	3.4

(See Table XXI.)

By calculating the average amount of retardation for the several grades, it is found that instead of increasing with the grade as we might expect, it decreases. For the first and second grades the average retardation is 2.93 years; for the third and fourth

2.86; for the fifth and sixth 2.67, and for the seventh and eighth 2.64. (Table XXII.) As the amount of retardation does not increase, even with the lower grades where its reduction by withdrawal is practically impossible, it appears that if the curriculum is to be considered a cause of retardation, it can be a cause only in the first grade. Probably the work of the first grade is not articulated properly with the life of the child before he enters school.

I offered as a proof of the reality of my causes of retardation the fact that their number increased regularly with the amount of retardation. To this the objection was made that as children of different grades belonged to a group who were retarded to the same extent, and as some of their retardation was to be ascribed to a curriculum which was less properly adapted to the child in the higher than in the lower grades, the groups might be altered if this factor of the curriculum were considered and thus the symptomatic series disturbed. It was claimed that the amount of retardation due to the curriculum should be deducted from the given amount of retardation. From the above table it appears that the assumption that the work of the higher grades is not so well adapted to the child as the work of the lower grades is not true. Moreover, if the assumption were true, the chances that it would make the series more rather than less symptomatic are at least equally great. Therefore it is not to be considered. In the fact that average retardation increases with age but not with the grade, we have a statement of the fact that retardation principally affects the lower grades. Here children must be considerably retarded before they are permitted to leave school. We have, therefore, an overcrowding in the lower grades which in itself is a cause of retardation. Retardation, therefore, becomes a cause of retardation by putting children on half time or so overcrowding the rooms that they become unfit for children and render the work of the teacher inefficient.

In this monograph have been set forth a method and a blank for the examination of retarded school children, as well as a method for the treatment of results. The problem of retardation itself has been considered. It was found that the thousand children represented in this investigation had an average retardation of 2.81 years and that it ranged from 1 to 7.5 years. Certain miscellaneous problems, like the withdrawal of children from school and the time devoted to the examination of a thousand cases, are also discussed. The records of a number of cases are given. From these it appears how certain facts were taken as causes of retardation. These causes are classed under the headings, physical, social, and psychical. It is thought that adequate causes have been found for the total retardation of 656 cases. For these cases the average number of physical, social, and psychical causes is 2.62. To these might be added a certain number of miscellaneous causes of an hereditary nature. In fact many of the other causes may be mere manifestations of the single cause, heredity. An attempt is made to show the reality of the causes by pointing out that their number increases with the amount of retardation. Several other proofs are also offered. The value of this inquiry would doubtless be much enhanced by a similar investigation of several thousand additional retarded cases, as well as by the examination of a thousand normal children for the sake of making a comparative study.

APPENDIX

TABLE I

	Boys		Girls		Totals	
	No.	Per Cent.	No.	Per Cent.	No.	Per Cent.
Retarded according to Superintendent's statistics (1905-06)	1076		957		2033	
Reported retarded by mistake			29		29	
Names appearing twice	1				1	
Actually retarded (1905-06)	1075		928		2003	
Absent at time of examination (1906-07)	123	11.4	102	11.	225	11.2
Refused to be examined			2		2	
Transferred to other schools in Camden	65.	6.	48	5.3	113	5.6
Withdrawn from Camden public schools	368	34.2	313	33.7	681	34.
Not examined	556	51.7	465	50.1	1021	50.9
Examined	519	48.3	463		982	49.1
Extra cases examined	21		9		30	
Extra cases used in this study	14		4		18	
Whole number of cases in this study	533		467		1000	

TABLE II

	Boys	Girls	Totals
Number withdrawn for reasons ascertained	246	174	420
Attending some other school	25	11	36
Normal school		1	1
Business college	8	3	11
Military academy	1		1
Private school	2		2
Parochial school	14	7	21
Working	192	91	283
Living at home and not working	2	47	49
In children's home	2	1	3
Withdrawn because of poverty	1	2	3
sickness	8	19	27
death	3	2	5
bad conduct	12		12
imprisonment	1	1	2
Number withdrawn for reasons not ascertained	122	139	261
Left Camden	63	56	119
No information	59	83	142
Total number withdrawn	368	313	681

TABLE III

Analysis of Retarded Children by Half Years of Retardation

Years	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	Totals
Boys	38	43	61	132	91	74	52	19	16	7	533
Girls	15	33	85	107	104	54	32	20	12	5	467
Totals	53	76	146	239	195	128	84	39	28	12	1000

TABLE IV

ANALYSIS OF RETARDED CHILDREN BY AGES OF ENTRANCE

AGE	5	6	7	8	9	10	11	12	TOTALS
Boys	61	134	149	86	33	11	4	3	481
Girls.........	53	113	136	84	29	12	4	2	433
TOTALS	114	247	285	170	62	23	8	5	914

TABLE V

SEVEN YEARS THE MOST FAVORABLE AGE FOR ENTERING SCHOOL.

	Age of Entrance	YEARS OF RETARDATION												Totals	Average Retard.	Average Retard. Boys and Girls
		1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5			
BOYS	5	4	9	6	17	11	10	3	1					61	2.57	2.63
	6	14	13	16	40	20	16	9	4	1	1			134	2.58	2.61
	7	16	9	21	43	30	16	10	3	1				149	2.56	2.62
	8	3	7	8	22	14	15	9	2	4	1		1	86	2.98	2.93
	9		1	3	5	6	7	5	3	2	1			33	3.37	3.05
	10			1		2	1	3	2	1	1			11	3.91	3.90
	11						1	2	1					4	4.00	4.13
	12							1	1	1				3	4.50	4.50
GIRLS	5		4	12	12	13	7	5						53	2.71	2.63
	6	5	14	23	25	21	11	7	4	2		1		113	2.64	2.61
	7	7	12	26	35	28	13	5	5	4		1		136	2.66	2.62
	8	1	2	18	17	23	13	5	2	1	2			84	2.88	2.93
	9			5	7	7	6	2	2					29	2.98	3.05
	10			1	1	2	1	1	3	3				12	3.88	3.90
	11						1	1	1	1				4	4.25	4.13
	12								2					2	4.50	4.50

TABLE VIa.

Distribution of Real Causes—Boys

	Number per child	Children affected	Physical							Social					Psychical		Total
			Health	Nutrition	Adenoids	Speech	Sight	Hearing	Tonsils	Entrance	Attendance	School History	Home Life	Language	Mentality	Conduct	
Adequate Causes	1	43	3	–	4	–	4	2	3	6	18	3	1	1	–	1	43
	2	119	20	5	13	5	16	5	–	38	54	23	39	7	8	2	238
	3	106	28	25	9	12	11	12	–	40	62	25	49	9	11	25	318
	4	46	16	24	7	8	13	4	–	23	27	13	29	4	11	5	184
	5	13	5	10	2	4	4	–	–	7	9	4	12	1	3	4	65
	6	6	6	5	1	2	1	1	–	2	6	1	6	–	3	3	36
	7	1	1	–	1	–	1	–	–	–	1	–	1	–	1	1	7
	9	1	1	–	1	1	1	1	–	1	1	–	1	–	1	–	9
	Totals	335	80	69	38	32	50	25	3	117	178	69	138	22	38	41	900
Contributory Factors	1	89	7	3	1	2	4	3	–	16	14	18	15	3	–	3	89
	2	15	2	2	1	1	–	2	1	5	3	3	6	1	–	4	30
	Totals	104	9	5	2	3	4	5	1	21	17	21	21	3	–	7	119
Grand Totals Boys		439	89	74	40	35	54	30	4	138	195	90	159	25	38	48	1019
Girls		412	111	46	26	18	98	24	2	135	208	107	97	18	18	15	923
Totals Boys & Girls		851	200	120	66	53	152	54	6	273	403	197	256	43	56	63	1942

TABLE VIb
DISTRIBUTION OF REAL CAUSES—GIRLS

			PHYSICAL							SOCIAL					PSYCHICAL		TOTAL
	Number per child	Children affected	Health	Nutrition	Adenoids	Speech	Sight	Hearing	Tonsils	Entrance	Attendance	School History	Home Life	Language	Mentality	Conduct	
Adequate Causes	1	42	2	–	3	–	9	–	–	4	16	7	–	–	1	–	42
	2	140	34	3	3	5	29	5	1	51	73	37	25	5	5	4	280
	3	80	29	14	9	6	23	5	1	34	54	19	26	9	6	5	240
	4	42	22	12	7	4	17	7	–	20	32	15	22	3	4	3	168
	5	15	13	11	4	1	8	3	–	6	11	7	9	–	2	–	75
	6	2	2	2	–	–	2	–	–	2	2	–	2	–	–	–	12
	Totals	321	102	42	26	16	88	20	2	117	188	85	84	17	18	12	817
Contributory Factors	1	16	8	3	–	1	6	4	–	15	15	16	7	–	–	1	76
	2	15	1	1	–	1	4	–	–	3	5	6	6	1	–	2	30
	Totals	91	9	4	–	2	10	4		18	20	22	13	1	–	3	106
Grand Totals Girls		412	111	46	26	18	98	24	2	135	208	107	97	18	18	15	923
Boys		439	89	74	40	35	54	30	4	138	195	90	159	25	38	48	1019
Totals Boys & Girls		851	200	120	66	53	152	54	6	273	403	197	256	43	56	63	1942

TABLE VIc.

DISTRIBUTION OF DOUBTFUL CAUSES—BOYS.

	Number of real causes per child	Children affected	PHYSICAL							SOCIAL			PSYCHICAL	TOTAL
			Health	Nutrition	Speech	Sight	Hearing	Tonsils	Smoking	School History	Home Life	Language	Conduct	
Associated Factors	1	43	7	7	3	3	2	8	2	9	17	5	5	68
	2	119	19	20	9	9	1	28	19	14	27	11	25	182
	3	106	13	10	5	10	3	25	18	5	27	4	18	138
	4	46	9	1	4	4	1	15	9	–	3	1	8	55
	5	13	4	–	1	1	–	3	3	1	–	1	–	14
	6	6	–	–	–	–	1	1	1	–	–	–	–	3
	7	1	–	–	–	–	–	–	1	–	–	–	–	1
	9	1	–	1	–	–	–	–	–	–	–	–	–	1
	Totals	335	52	39	22	27	8	80	53	29	74	22	56	462
Contributory Factors	1	89	17	12	7	2	3	20	16	6	19	7	21	130
	2	15	1	3	2	2	1	3	4	3	2	1	2	24
	Totals	104	18	15	9	4	4	23	20	9	21	8	23	154
Totals		439	70	54	31	31	12	103	73	38	95	30	79	616
Unassociated Factors	1	31	–	2	2	2	–	11	4	6	1	–	3	31
	2	26	5	1	5	3	2	12	4	7	8	3	2	52
	3	6	–	2	–	–	–	3	3	2	3	1	4	18
	4	6	3	5	–	1	–	5	2	1	4	1	2	24
	5	1	1	1	–	1	–	–	1	1	–	–	–	5
	Totals	70	9	11	7	7	2	31	14	17	16	5	11	130
Grand Totals Boys		509	79	65	38	38	14	134	87	55	111	35	90	746
Girls		452	64	68	25	45	27	130	-	40	79	24	35	537
Totals Boys & Girls		961	143	133	63	83	41	264	87	95	190	59	125	1283

TABLE VId.

Distribution of Doubtful Causes—Girls.

	Number of real causes per child	Children affected	Physical							Social			Psychical	Total
			Health	Nutrition	Speech	Sight	Hearing	Tonsils	Smoking	School History	Home Life	Language	Conduct	
Associated Factors	1	42	6	2	–	1	2	11	–	5	9	5	2	43
	2	140	20	23	4	15	13	43	–	13	24	6	8	169
	3	80	13	11	6	8	3	20	–	9	10	3	10	93
	4	42	4	8	4	4	3	10	–	1	5	2	4	45
	5	15	–	–	–	1	1	6	–	–	1	1	2	12
	6	2	–	–	–	–	1	1	–	–	–	–	–	2
	Totals	321	43	44	14	29	23	91	–	28	49	17	26	364
Contributory Factors	1	76	9	12	6	7	4	18	–	3	16	4	4	83
	2	15	2	4	1	1	–	5	–	–	1	–	1	15
	Totals	91	11	16	7	8	4	23	–	3	17	4	5	98
	Totals	412	54	60	21	37	27	114	–	31	66	21	31	462
Unassociated Factors	1	18	1	1	1	–	–	8	–	1	3	–	3	18
	2	11	2	1	1	5	–	5	–	2	5	–	1	22
	3	9	5	5	2	2	–	2	–	5	5	1	–	27
	4	2	2	1	–	1	–	1	–	1	–	2	–	8
	Totals	40	10	8	4	8	–	16	–	9	13	3	4	75
Grand Totals Girls		452	64	68	25	45	27	130	–	40	79	24	35	537
Boys		509	79	65	38	38	14	134	87	55	111	35	90	746
Totals Boys & Girls		961	143	133	63	83	41	264	87	95	190	59	125	1283

TABLE VII.

CORRELATION OF AMOUNT OF RETARDATION WITH THE NUMBER OF CHILDREN FOR WHOM NO CAUSES, UNASSOCIATED FACTORS AND REAL CAUSES WERE FOUND.

Amount of Retardation	No Causes						Unassociated Factors						Real Causes						Total, number of Boys	Total number of Girls	Total Boys and Girls
	Number of Boys	Percentage	Number of Girls	Percentage	Boys and Girl	Percentage	Number of Boys	Percentage	Number of Girls	Percentage	Boys and Girls	Percentage	Number of Boys	Percentage	Number of Girls	Percentage	Boys and Girls	Percentage			
1.	4	10.5	0	0.0	4	7.5	13	34.2	2	13.3	15	28.3	21	55.3	13	86.7	34	64.1	38	15	53
1.5	3	7.0	4	12.1	7	9.2	3	7.0	3	9.1	6	7.9	37	86.0	26	78.8	63	82.9	43	33	76
Total 1 & 1.5	*7*	*8.6*	*4*	*8.3*	*11*	*8.5*	*16*	*19.7*	*5*	*10.4*	*21*	*16.3*	*58*	*71.6*	*39*	*81.2*	*97*	*75.2*	*81*	*48*	*129*
2.	5	8.2	2	2.4	7	4.8	18	29.5	10	11.8	28	19.2	38	62.3	73	85.9	111	76.0	61	85	146
2.5	5	3.8	3	2.8	8	3.3	14	10.6	13	12.1	27	11.3	113	85.6	91	85.0	204	85.4	132	107	239
Total 2 & 2.5	*10*	*5.2*	*5*	*2.6*	*15*	*3.9*	*32*	*16.6*	*23*	*12.0*	*55*	*14.3*	*151*	*78.2*	*164*	*85.4*	*315*	*81.8*	*193*	*192*	*385*
3.	6	6.6	2	1.9	8	4.1	11	12.1	5	4.8	16	8.2	74	81.3	97	93.2	171	87.7	91	104	195
3.5	0	0.0	3	5.6	3	2.3	7	9.5	4	7.4	11	8.6	67	90.5	47	87.0	114	89.0	74	54	128
Total 3 & 3.5	*6*	*3.6*	*5*	*3.1*	*11*	*3.4*	*18*	*10.9*	*9*	*5.7*	*27*	*8.4*	*141*	*85.4*	*144*	*91.1*	*285*	*88.2*	*165*	*158*	*323*
4.	1	1.9	0	0.0	1	1.2	3	5.8	3	9.4	6	7.1	48	92.3	29	90.6	77	91.7	52	32	84
4.5	0	0.0	1	5.0	1	2.6	1	5.3	0	0.0	1	2.6	18	94.7	19	95.0	37	94.9	19	20	39
Total 4 & 4.5	*1*	*1.4*	*1*	*1.9*	*2*	*1.6*	*4*	*5.6*	*3*	*5.7*	*7*	*5.7*	*66*	*93.0*	*48*	*92.3*	*114*	*92.7*	*71*	*52*	*123*
5.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	16	100.0	12	100.0	28	100.0	16	12	28
5.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	7	100.0	5	100.0	12	100.0	7	5	12
Total 5 & 5.5	*0*	*0.0*	*0*	*0.0*	*0*	*0.0*	*0*	*0.0*	*0*	*0.0*	*0*	*0.0*	*23*	*100.0*	*17*	*100.0*	*40*	*100.0*	*23*	*17*	*40*

TABLE VIIIA

CORRELATION OF RETARDATION WITH NUMBER OF VARIOUS FACTORS—BOYS

AMOUNT OF RETARDATION	REAL CAUSES			ADEQUATE CAUSES			DOUBTFUL CAUSES			CONTRIBUTORY FACTORS			UNASSOCIATED FACTORS			REAL AND ASSOCIATED			ADEQUATE AND ASSOCIATED			CONTRIBUTORY AND ASSOCIATED		
	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average
1.	21	36	1.71	18	33	1.83	34	64	1.88	3	3	1.00	13	28	2.15	21	72	3.43	18	65	3.61	3	7	2.33
1.5	37	65	1.76	28	55	1.96	40	64	1.60	9	10	1.11	3	6	2.00	37	123	3.32	28	98	3.50	9	25	2.78
2.	38	81	2.13	34	76	2.24	56	84	1.50	4	5	1.25	18	37	2.06	38	128	3.37	34	117	3.44	4	11	2.75
2.5	113	224	1.98	78	186	2.38	127	189	1.49	35	38	1.09	14	23	1.64	113	390	3.45	78	305	3.91	35	85	2.43
3.	74	175	2.36	53	152	2.87	85	105	1.24	21	23	1.10	11	17	1.55	74	283	3.82	53	215	4.06	21	48	2.29
3.5	67	183	2.73	52	166	3.19	74	105	1.42	15	17	1.13	7	11	1.57	67	277	4.13	52	235	4.52	15	42	2.80
4.	48	125	2.60	37	110	2.97	51	71	1.39	11	15	1.36	3	5	1.67	48	191	3.98	37	160	4.33	11	31	2.82
4.5	18	48	2.67	15	44	2.93	19	33	1.74	3	4	1.33	1	3	3.00	18	79	4.39	15	66	4.40	3	12	4.00
5.	16	57	3.56	15	55	3.67	16	20	1.25	1	2	2.00	0	0	0.00	16	76	4.75	15	71	4.73	1	6	6.00
5.5	7	25	3.57	5	23	4.69	7	11	1.57	2	2	1.00	0	0	0.00	7	36	5.14	5	30	6.00	2	6	3.00

TABLE VIIIb.

Correlation of Retardation with Number of Various Factors—Girls.

Amount of Retardation	Real Causes			Adequate Causes			Doubtful Causes			Contributory Factors			Unassociated Factors			Real and Associated			Adequate and Associated			Contributory and Associated		
	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average
1.	13	23	1.77	12	22	1.83	15	17	1.13	1	1	1.00	2	3	1.50	13	37	2.85	12	35	2.92	1	2	2.00
1.5	26	46	1.77	23	43	1.87	29	47	1.62	3	3	1.00	3	11	3.67	26	82	3.15	23	77	3.35	3	5	1.67
2.	73	141	1.93	56	124	2.22	83	94	1.13	17	17	1.00	10	19	1.90	73	216	2.96	56	182	3.25	17	34	2.00
2.5	91	189	2.08	67	162	2.42	104	126	1.21	24	27	1.13	13	21	1.62	91	294	3.23	67	241	3.60	24	53	2.21
3.	97	220	2.27	74	192	2.60	102	114	1.12	23	28	1.22	5	11	2.20	97	323	3.33	74	273	3.69	23	50	2.17
3.5	47	110	2.34	36	96	2.67	51	62	1.21	11	14	1.27	4	6	1.50	47	166	3.53	36	138	3.83	11	28	2.55
4.	29	74	2.55	22	66	3.00	32	36	1.13	7	8	1.14	3	4	1.33	29	106	3 66	22	89	4.05	7	17	2.43
4.5	19	65	3.42	16	60	3.75	19	24	1.26	3	5	1.67	0	0	0.00	19	89	3.68	16	78	4.87	3	11	3.67
5.	12	37	3.08	10	34	3.40	12	12	1.00	2	3	1.50	0	0	0.00	12	49	4.08	10	45	4.50	2	4	2.00
5.5	5	18	3.60	5	18	3.60	5	5	1.00	0	0	0.00	0	0	0.00	5	23	4.60	5	23	4.60	0	0	0 00

TABLE VIIIc.

CORRELATION OF RETARDATION WITH NUMBER OF VARIOUS FACTORS—BOYS AND GIRLS.

AMOUNT OF RETARDATION	REAL CAUSES			ADEQUATE CAUSES			DOUBTFUL CAUSES			CONTRIBUTORY FACTORS			UNASSOCIATED FACTORS			REAL AND ASSOCIATED			ADEQUATE AND ASSOCIATED			CONTRIBUTORY AND ASSOCIATED		
	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average	Number Affected	Number of Factors	Average
1.	34	59	1 74	30	55	1.83	49	81	1.65	4	4	1.00	15	31	2.07	34	109	3.21	30	100	3.33	4	9	2.25
1.5	63	111	1.76	51	98	1.92	69	111	1.61	12	13	1.08	6	17	2.84	63	205	3.25	51	175	3.42	12	30	2.50
Total 1 & 1.5	*97*	*170*	*1.75*	*81*	*153*	*1.89*	*118*	*192*	*1.63*	*16*	*17*	*1.06*	*21*	*48*	*2.28*	*97*	*314*	*3.24*	*81*	*275*	*3.40*	*16*	*39*	*2.44*
2.	111	222	2.00	90	200	2.22	139	178	1.28	21	22	1.05	28	56	2.00	111	344	3.10	90	299	3.32	21	45	2.14
2.5	204	413	2.02	145	348	2.40	231	315	1.36	59	65	1.10	27	44	1.63	204	684	3.35	145	546	3.77	59	138	2.34
Total 2 & 2.5	*315*	*635*	*2.02*	*235*	*548*	*2.33*	*370*	*493*	*1.33*	*80*	*87*	*1.09*	*55*	*100*	*1.82*	*315*	*1028*	*3.26*	*235*	*845*	*3.59*	*80*	*183*	*2.29*
3.	171	395	2.31	127	344	2.71	187	219	1.17	44	51	1.16	16	28	1.75	171	586	3.43	127	488	3.84	44	98	2.23
3.5	114	293	2.57	88	262	2.98	125	167	1.34	26	31	1.19	11	17	1.54	114	443	3.89	88	373	4.24	26	70	2.69
Total 3 & 3.5	*285*	*688*	*2.41*	*215*	*606*	*2.82*	*312*	*386*	*1.24*	*70*	*82*	*1.17*	*27*	*45*	*1.67*	*285*	*1029*	*3.61*	*215*	*861*	*4.00*	*70*	*168*	*2.40*
4.	77	199	2.58	59	176	2.98	83	107	1.29	18	23	1.28	6	9	1 50	77	297	3.86	59	249	4.22	18	48	2.67
4.5	37	113	3.05	31	104	3.36	38	57	1.50	6	9	1.50	1	3	3.00	37	168	4.54	31	144	4.65	6	23	3.83
Total 4 & 4.5	*114*	*312*	*2.70*	*90*	*280*	*3.11*	*121*	*164*	*1.36*	*24*	*32*	*1.33*	*7*	*12*	*1.71*	*114*	*465*	*4.08*	*90*	*393*	*4.37*	*24*	*71*	*2.96*
5.	28	94	3.36	25	89	3.56	28	32	1.14	3	5	1.67	0	0	0.00	28	125	4.46	25	116	4.64	3	10	3.33
5.5	12	43	3.58	10	41	4.10	12	16	1.33	2	2	1.00	0	0	0.00	12	59	4.92	10	53	5.30	2	6	3.00
Total 5 & 5.5	*40*	*137*	*3.43*	*35*	*130*	*3.71*	*40*	*48*	*1.20*	*5*	*7*	*1.40*	*0*	*0*	*0.00*	*40*	*184*	*4.60*	*35*	*169*	*4.83*	*5*	*16*	*3.20*

TABLE IX

CORRELATION OF AMOUNT OF RETARDATION WITH AVERAGE AGE

AMOUNT OF RETARDATION	BOYS Age at Nearest Birthday										TOTAL BOYS	AVERAGE AGE	GIRLS Age at Nearest Birthday										TOTAL GIRLS	AVERAGE AGE	MEAN OF AV. AGE BOYS & GIRLS
	9	10	11	12	13	14	15	16	17	18			9	10	11	12	13	14	15	16	17	18			
1	2	16	7	7	4	2					38	11.0	3	3	4	3	2						15	10.8	10.9
1.5	1	9	11	5	7	7	2	1			43	11.9	1	4	12	5	5	3	3				33	11.9	11.9
2	1	8	6	18	21	4	2	1			61	12.2	1	7	22	17	15	14	5	4			85	12.4	12.3
2.5		5	23	34	24	24	11	9	2		132	12.9	1	4	14	21	21	25	8	7	6		107	13.1	13.0
3		1	13	12	24	26	9	6			91	13.2			8	17	30	22	11	10	5	1	104	13.5	13.4
3.5		1	7	11	16	21	12	2	3	1	74	13.6			2	6	16	13	4	8	2	3	54	14.1	13.9
4				9	14	15	8	4	1	1	52	13.7				5	6	6	12	2	1		32	14.1	13.9
4.5				2	3	8	4	1	1		19	14.1				1	6	7	3	2	1		20	14.1	14.1
5				3	4	2	3	3	1		16	14.1					3	1	4	3	1		12	14.8	14.5
5.5					1	3	2			1	7	14.7					1		1	1	2		5	15.6	15.2
	4	40	67	101	118	112	53	27	8	3	533		6	18	62	75	105	91	51	37	18	4	467		

TABLE X

CORRELATION OF AMOUNT OF RETARDATION WITH VARIOUS GROUPS OF CAUSES

AMOUNT OF RETARDATION	PHYSICAL						SOCIAL						PSYCHICAL						Total number of Boys	Total number of Girls	Total, Boys and Girls
	BOYS		GIRLS		BOYS AND GIRLS		BOYS		GIRLS		BOYS AND GIRLS		BOYS		GIRLS		BOYS AND GIRLS				
	Number of Causes	Average No. per Boy	Number of Causes	Average No. per Girl	Number of Causes	Average No. per Child	Number of Causes	Average No. per Boy	Number of Causes	Average No. per Girl	Number of Causes	Average No. per Child	Number of Causes	Average No. per Boy	Number of Causes	Average No. per Girl	Number of Causes	Average No. per Child			
1.	12	.57	12	.92	24	.71	22	1.05	10	.77	32	.94	2	.10	1	.08	3	.09	21	13	34
1.5	23	.62	16	.62	39	.62	41	1.11	29	1.12	70	1.11	1	.03	1	.04	2	.03	37	26	63
Total 1 & 1.5	*35*	*.60*	*28*	*.72*	*63*	*65*	*63*	*1.08*	*39*	*1.00*	*102*	*1.05*	*3*	*.05*	*2*	*.05*	*5*	*.05*	*58*	*39*	*97*
2.	22	.58	52	.71	74	.67	52	1.37	87	1.19	134	1.25	7	.18	2	.03	9	.08	38	73	111
2.5	79	.70	53	.58	132	.65	131	1.16	128	1.41	259	1.27	14	.12	8	.09	22	.11	113	91	204
Total 2 & 2.5	*101*	*.67*	*105*	*.64*	*206*	*.65*	*183*	*1.21*	*215*	*1.31*	*398*	*1.26*	*21*	*.13*	*10*	*.06*	*31*	*.10*	*151*	*164*	*315*
3.	60	.81	86	.89	146	.85	100	1.35	127	1.31	227	1.33	15	.20	7	.07	22	.13	74	97	171
3.5	56	.84	31	.66	87	.76	106	1.58	75	1.60	181	1.59	21	.31	4	.09	25	.22	67	47	114
Total 3 & 3.5	*116*	*.82*	*117*	*.81*	*233*	*.82*	*206*	*1.46*	*202*	*1.41*	*408*	*1.43*	*36*	*.25*	*11*	*.07*	*47*	*.16*	*141*	*144*	*285*
4.	32	.67	29	1.00	61	.79	77	1.60	42	1.45	119	1.55	16	.33	3	.10	19	.25	48	29	77
4.5	12	.67	28	1.47	40	1.08	33	1.83	33	1.74	56	1.78	3	.17	4	.21	7	.19	18	19	37
Total 4 & 4.5	*44*	*.67*	*57*	*1.19*	*101*	*.89*	*110*	*1.67*	*75*	*1.56*	*185*	*1.62*	*19*	*.29*	*7*	*.14*	*26*	*.23*	*66*	*48*	*114*
5.	20	1.25	10	.83	30	1.07	32	2.00	25	2.08	57	2.04	5	.31	2	.17	7	.25	16	12	28
5.5	10	1.43	8	1.60	18	1.50	13	1.86	9	1.80	22	1.83	2	.29	1	.20	3	.25	7	5	12
Total 5 & 5.5	*30*	*1.30*	*18*	*1.06*	*48*	*1.20*	*45*	*1.96*	*34*	*2.00*	*79*	*1.98*	*7*	*.30*	*3*	*.18*	*10*	*.25*	*23*	*17*	*40*

TABLE XI

CORRELATION OF AMOUNT OF RETARDATION WITH THE NUMBER OF CASES REPORTED TO BE "SLOW AND DULL"

Amount of Retardation.	Whole Number of Boys	Slow and Dull Boys	Percentage	Whole Number of Girls	Slow and Dull Girls	Percentage	Whole Number Boys and Girls	Slow and Dull Children	Percentage
1.	38	9	23.7	15	1	6.7	53	10	18.9
1.5	43	5	11.6	33	9	27.3	76	14	18.4
Total 1 & 1.5	*81*	*14*	*17.3*	*38*	*10*	*26.3*	*129*	*24*	*18.6*
2.	61	16	26.2	85	26	30.6	146	42	28.8
2.5	132	46	34.8	107	35	32.7	239	81	33.9
Total 2 & 2.5	*193*	*62*	*32.1*	*192*	*61*	*31.8*	*385*	*123*	*31.9*
3.	91	31	34.1	104	39	37.5	195	70	35.9
3.5	74	26	35.1	54	23	42.6	128	49	38.3
Total 3 & 3.5	*165*	*57*	*34.5*	*158*	*62*	*39.2*	*323*	*119*	*36.8*
4.	52	20	38.5	32	13	40.6	84	33	39.3
4.5	19	10	52.6	20	6	30.0	39	16	41.0
Total 4 & 4.5	*71*	*30*	*42.2*	*52*	*19*	*36.3*	*123*	*49*	*39.8*
5.	16	5	31.3	12	8	66.7	28	13	46.4
5.5	7	4	57.1	5	2	40.0	12	6	50.0
Total 5 & 5.5	*23*	*9*	*39.1*	*17*	*10*	*58.8*	*40*	*19*	*48.0*

TABLE XII

CORRELATION OF CAUSES WITH AVERAGE AMOUNT OF RETARDATION IN YEARS*

Causes	Boys			Girls			Boys and Girls		
	Total Retardation	Number of Boys	Average Retardation	Total Retardation	Number of Girls	Average Retardation	Total Retardation	Number of Children	Average Retardation
1 Adequate	97	43	2.26	93	42	2.21	190	85	2.24
2 "	317.5	119	2.67	370	140	2.64	687.5	259	2.65
3 "	327	106	3.08	244	80	3.05	571	186	3.07
4 "	158	46	3.43	141	42	3.36	299	88	3.40
5 "	82.5	21	3.93	63.5	17	3.74	146	38	3.84
Totals	982	335	2.93	911.5	321	2.84	1893.5	656	2.89
No Causes	53	24	2.21	38.5	15	2.57	91.5	39	2.35
Unassociated Factors	162.5	70	2.32	100	40	2.50	262.5	110	2.39
Real Causes	1283	439	2.92	1170	412	2.84	2453.	851	2.88
Grand Totals	1498.5	533	2.81	1308.5	467	2.80	2807	1000	2.81

*When the amount of retardation was more than 5.5 years, it was taken as 5.5 in thi table.

TABLE XIII

CORRELATION OF SOCIAL LEVEL OF THE SCHOOL DISTRICTS WITH NUMBER RETARDED

SOCIAL LEVEL	NUMBER RETARDED	AVERAGE ENROLMENT 1905–06	PERCENTAGE RETARDED
5	116	708	16.3
4	357	1846	19.3
3	515	2780	18.6
2	612	3063	19.3
1	163	710	22.9
Negroes	240	645	37.2

TABLE XIVa—BOYS

Correlation of Amount of Retardation with the Number of Cases for which the Several Causes Appear as Real

Amount of Retardation	Whole Number of Boys	Health		Nutrition		Adenoids		Speech		Sight		Hearing		Entrance		Attendance		School History		Home Life		Language		Mental Defic'y	
		Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage
1.	21	3	14.3	1	4.8	1	4.8	2	9.5	1	4.8	4	19.0	3	14.3	6	28.6	2	9.5	7	33.3	4	19.0	0	0.0
1.5	37	5	13.5	8	21.6	2	5.4	2	5.4	4	10.8	2	5.4	8	21.6	9	24.3	12	32.4	11	29.7	1	2.7	0	0.0
2.	38	5	13.2	3	7.9	4	10.5	1	2.6	4	10.5	4	10.5	12	31.6	18	47.4	5	13.2	16	42.1	1	2.6	3	7.9
2.5	113	25	22.1	14	12.4	9	8.0	8	7.1	14	12.4	9	8.0	26	23.0	47	41.6	24	21.2	34	30.1	0	0.0	4	3.5
3.	74	19	25.7	17	23.0	8	10.8	4	5.4	8	10.8	2	2.7	23	31.1	28	37.8	17	23.0	25	33.8	7	9.5	7	9.5
3.5	67	16	23.9	14	20.9	8	11.9	4	6.0	12	17.9	2	3.0	26	38.8	34	50.7	15	22.4	25	37.3	6	9.0	10	14.9
4.	48	4	8.3	8	16.7	5	10.4	7	14.6	5	10.4	3	6.3	18	37.5	26	54.2	9	18.8	21	43.8	3	6.3	8	16.7
4.5	18	3	16.7	4	22.2	1	5.6	1	5.6	2	11.1	1	5.6	9	50.0	11	61.1	4	22.2	7	38.9	2	11.1	2	11.1
5.	16	6	37.5	4	25.0	0	0.0	4	25.0	3	18.8	2	12.5	8	50.0	12	75.0	2	12.5	9	56.3	1	6.3	3	18.8
5.5	7	3	42.9	1	14.3	2	28.6	2	28.6	1	14.3	1	14.3	5	71.4	4	57.1	0	0.0	4	57.1	0	0.0	1	14.3

TABLE XIVb—GIRLS

Correlation of Amount of Retardation with the Number of Cases for which the Several Causes Appear as Real

Amount of Retardation	Whole Number of Girls	Health		Nutrition		Adenoids		Speech		Sight		Hearing		Entrance		Attendance		School History		Home Life		Language		Mental Defic'y	
		Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage
1.	13	4	30.8	1	7.7	2	15.4	0	0.0	4	30.8	1	7.7	1	7.7	6	46.2	2	15.4	1	7.7	0	0.0	1	7.7
1.5	26	4	15.4	3	11.5	1	3.8	1	3.8	6	23.1	1	3.8	2	7.7	14	53.9	7	26.9	5	19.2	1	3.8	0	0.0
2.	73	20	27.4	7	9.6	4	5.5	2	2.7	15	20.6	4	5.5	24	32.9	28	38.4	20	27.4	11	15.1	4	5.5	0	0.0
2.5	91	17	18.7	4	4.4	6	6.6	5	5.5	17	18.7	4	4.4	27	29.7	50	55.0	24	26.4	21	23.1	6	6.6	4	4.4
3.	97	31	32.0	14	14.4	4	4.1	3	3.1	24	24.7	9	9.3	33	34.0	44	45.4	21	21.6	26	26.8	3	3.1	4	4.1
3.5	47	14	29.8	4	8.5	3	6.4	1	2.1	8	17.0	1	2.1	21	44.7	29	61.7	10	21.3	15	31.9	0	0.0	2	4.3
4.	29	8	27.6	4	13.8	2	6.9	3	10 3	10	34.5	2	6.9	11	37.9	16	55.2	11	38.0	4	13.8	0	0.0	3	10.7
4.5	19	7	36.8	7	36.8	3	15.8	1	5.3	9	47.4	1	5.3	8	42.1	10	52.6	5	26.3	7	36.8	3	15.8	2	10.5
5.	12	4	33.3	2	16.7	1	8.3	1	8.3	2	16.7	0	0.0	5	41.6	8	66.7	5	41.7	6	50.0	1	8.3	1	8.3
5.5	5	2	40.0	0	0.0	0	0.0	1	20.0	3	60.0	1	20.0	3	60.0	3	60.0	2	40.0	1	20.0	0	0.0	1	20.0

TABLE XIVc—BOYS AND GIRLS

CORRELATION OF AMOUNT OF RETARDATION WITH THE NUMBER OF CASES FOR WHICH THE SEVERAL CAUSES APPEAR AS REAL

Amount of Retardation.	Whole Number of Boys and Girls	HEALTH		NUTRITION		ADENOIDS		SPEECH		SIGHT		HEARING		ENTRANCE		ATTENDANCE		SCHOOL HISTORY		HOME LIFE		LANGUAGE		MENTAL DEFIC'Y	
		Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage	Number of Cases	Percentage
1.	34	7	20.6	2	5.9	3	8.8	2	5.9	5	14.7	5	14.7	4	11.8	12	35 3	4	11.8	8	23.5	4	11.8	1	2.9
1.5	63	9	14.3	11	17.5	3	4.8	3	4.8	10	15.9	3	4.8	10	15.9	23	36.5	19	30.2	16	25.4	2	3.7	0	9.0
Total 1 & 1.5	*97*	*16*	*16.5*	*13*	*13.4*	*6*	*6.2*	*5*	*5.2*	*15*	*15.5*	*8*	*8.2*	*14*	*14.4*	*35*	*36.1*	*23*	*23.7*	*24*	*24.7*	*6*	*6.2*	*1*	*1.0*
2.	111	25	22.5	10	9.0	8	7.2	3	2.7	19	17.1	8	7.2	36	32.4	46	41.4	25	22.5	27	24.4	5	4.5	3	2.7
2.5	204	42	20.6	18	8.8	15	7.4	13	6.4	31	15.2	13	6.4	53	26.0	97	47.5	48	23.5	55	27.0	6	2.9	8	3.9
Total 2 & 2.5	*315*	*67*	*21.3*	*28*	*8.9*	*23*	*7.3*	*16*	*5.1*	*50*	*15.9*	*21*	*6.7*	*89*	*28.3*	*143*	*45.4*	*73*	*23.2*	*82*	*26.0*	*11*	*3.5*	*11*	*3.5*
3.	171	50	29.2	31	18.1	12	7.0	7	4.1	32	18.7	11	6.4	56	32.7	72	42.1	38	22.2	51	29.8	10	5.8	11	6.4
3.5	114	30	26.3	18	15.8	11	9.6	5	4.4	20	17.5	3	2.6	47	41.2	63	55.3	25	21.9	40	35.1	6	5.3	12	10.5
Total 3 & 3.5	*285*	*80*	*28.0*	*49*	*17.2*	*23*	*8.1*	*12*	*4.2*	*52*	*18.2*	*14*	*4.9*	*103*	*36.1*	*135*	*47.4*	*63*	*22.1*	*91*	*31.9*	*16*	*5.6*	*23*	*8.1*
4.	77	12	15.6	12	15.6	7	9 1	10	13.0	15	19.5	5	6.5	29	37.7	42	54.5	20	26.0	25	32.5	3	4.1	11	14.3
4.5	37	10	27.0	11	29.7	4	10.8	2	5.4	11	29.7	2	5.4	17	46.0	21	56.8	9	24.3	14	37.8	5	13.5	4	10.8
Total 4 & 4.5	*114*	*22*	*19.3*	*23*	*20.2*	*11*	*9.6*	*12*	*10.5*	*26*	*22.8*	*7*	*6.1*	*46*	*40.4*	*63*	*55.2*	*29*	*25.4*	*39*	*34.2*	*8*	*7.0*	*15*	*13.2*
5.	28	10	35.7	6	21 4	1	3.6	5	17.9	5	17.9	2	7.1	13	46.4	20	71.4	7	25.0	15	53.6	2	7.1	4	14.3
5.5	12	5	41.7	1	8.3	2	16.7	3	25.0	4	33.3	2	16.7	8	66.6	7	58.3	2	16.7	5	41.7	0	0.0	2	16.7
Total 5 & 5.5	*40*	*15*	*37.5*	*7*	*17.5*	*3*	*7.5*	*8*	*20.0*	*9*	*22.5*	*4*	*10.0*	*21*	*52.5*	*27*	*67.5*	*9*	*22.5*	*20*	*50.0*	*2*	*5.0*	*6*	*15.0*

TABLE XV

CORRELATION OF AMOUNT OF RETARDATION WITH NUMBER OF BOYS WHO SMOKE

Amount of Retardation	Number of Boys Questioned	Number of Boys who Smoke	Percentage
1.	34	3	8.8
1.5	40	4	10.0
Total 1 & 1.5	*74*	*7*	*9.5*
2.	56	7	12.5
2.5	127	17	13.4
Total 2 & 2.5	*183*	*24*	*13.1*
3.	85	14	16.5
3.5	79	17	21.5
Total 3 & 3.5	*164*	*31*	*18.9*
4.	51	12	23.5
4.5	19	5	26.3
Total 4 & 4.5	*70*	*17*	*24.3*
5.	16	4	25.0
5.5	7	4	57.1
Total 5 & 5.5	*23*	*8*	*34.8*

TABLE XVI

CORRELATION OF AMOUNT OF RETARDATION WITH NUMBER OF CHILDREN WHO DRINK TEA AND COFFEE, OR EAT POOR BREAKFASTS

Amount of Retardation	TEA AND COFFEE						POOR BREAKFASTS						Total Number of Boys Questioned	Total Number of Girls Questioned	Total, Boys and Girls Questioned
	Number of Boys	Percentage	Number of Girls	Percentage	Number of Boys and Girls	Percentage	Number of Boys	Percentage	Number of Girls	Percentage	Number of Boys and Girls	Percentage			
1.	18	85.7	7	63.6	25	78.1	6	28.6	4	36.4	10	31.2	21	11	32
1.5	10	55.5	14	53.8	24	54.5	3	16.6	9	34.6	12	27.3	18	26	44
Total 1 & 1.5	*28*	*71.9*	*21*	*56.7*	*49*	*64.4*	*9*	*23.7*	*13*	*35.1*	*22*	*28.9*	*39*	*37*	*76*
2.	32	84.2	42	62.7	74	70.5	6	15.8	16	23.9	22	21.0	38	67	105
2.5	63	75.0	59	68.6	122	71.8	26	30.9	27	31.4	53	31.1	84	86	170
Total 2 & 2.5	*95*	*77.9*	*101*	*66.0*	*196*	*71.3*	*32*	*26.2*	*43*	*28.1*	*75*	*27.2*	*122*	*153*	*275*
3.	34	73.9	67	76.1	101	75.4	14	30.4	37	42.0	51	38.1	46	88	134
3.5	32	76.2	34	66.6	66	71.0	8	19.0	11	21.6	19	20.4	42	51	93
Total 3 & 3.5	*66*	*75.0*	*101*	*72.7*	*167*	*73.6*	*22*	*25.0*	*48*	*34.6*	*70*	*30.9*	*88*	*139*	*227*
4.	25	67.7	17	70.8	42	68.9	7	18.9	9	37.5	16	26.2	37	24	61
4.5	6	100.0	13	86.6	19	90.5	2	33.3	4	26.6	6	28.6	6	15	21
Total 4 & 4.5	*31*	*72.1*	*30*	*76.9*	*61*	*74.4*	*9*	*20.9*	*13*	*33.3*	*22*	*26.8*	*43*	*39*	*82*
5.	3	33.3	5	55.5	8	44.4	2	22.2	4	44.4	6	33.3	9	9	18
5.5	3	75.0	1	25.0	4	50.0	1	25.0	0	0.0	1	12.5	4	4	8
Total 5 & 5.5	*6*	*46.1*	*6*	*46.1*	*12*	*46.1*	*3*	*23.1*	4	*30.7*	*7*	*27.0*	*13*	*13*	26

TABLE XVII

Correlation of Amount of Retardation with Number of Children Deprived of One or Both Parents; with Number of Sisters and Brothers Living; and with Number of Sisters and Brothers Dead

Amount of Retardation	Children Deprived of Parents						Sisters and Brothers Living						Sisters and Brothers Dead						Total Number of Boys	Total Number of Girls	Total, Boys and Girls
	Number of Boys	Percentage	Number of Girls	Percentage	Number of Boys and Girls	Percentage	Sisters and Brothers of Boys	Average No. per Boy	Sisters and Brothers of Girls	Average No. per Girl	Sisters and Brothers of both Boys and Girls	Average No. per Child	Sisters and Brothers of Boys	Average No. per Boy	Sisters and Brothers of Girls	Average No. per Girl	Sisters and Brothers of both Boys and Girls	Average No. per Child			
1.	4	10.5	3	20.0	7	13.2	109	2.87	43	2.86	152	2.87	31	.82	7	.47	38	.72	38	15	53
1.5	10	23.2	6	18.2	16	21.0	122	2.84	113	3.42	235	3.09	36	.84	25	.76	61	.80	43	33	76
Total 1 & 1.5	*14*	*17.3*	*9*	*18.4*	*23*	*17.8*	*231*	*2.85*	*156*	*3.18*	*387*	*3.00*	*67*	*.83*	*32*	*.65*	*99*	*.77*	*81*	*49*	*129*
2.	14	22.9	21	24.7	35	24.0	182	2.98	283	3.33	465	3.19	62	1.02	104	1.24	166	1.14	61	85	146
2.5	34	25.6	20	18.7	54	22.6	401	3.04	378	3.53	779	3.26	164	1.24	112	1.05	276	1.15	132	107	239
Total 2 & 2.5	*48*	*24.9*	*41*	*21.4*	*89*	*23.1*	*683*	*3.02*	*661*	*3.44*	*1244*	*3.23*	*226*	*1.12*	*216*	*1.13*	*442*	*1.15*	*193*	*192*	*385*
3.	23	25.3	23	22.1	46	23.6	268	2.94	351	3.47	619	3.18	102	1.12	159	1.53	261	1.34	91	104	195
3.5	21	28.4	12	22.2	33	25.8	257	3.48	181	3.35	438	3.42	84	1.13	66	1.22	150	1.17	74	54	128
Total 3 & 3.5	*44*	*26.7*	*35*	*22.2*	*79*	*24.4*	*525*	*3.12*	*532*	*3.37*	*1057*	*3.27*	*186*	*1.13*	*225*	*1.42*	*411*	*1.27*	*165*	*158*	*323*
4.	9	17.3	9	27.1	18	21.4	192	3.69	111	3.47	303	3.61	71	1.37	48	1.50	119	1.42	52	32	84
4.5	7	36.8	7	35.0	14	35.9	72	3.79	66	3.30	138	3.54	33	1.74	23	1.15	56	1.44	19	20	39
Total 4 & 4.5	*16*	*22.5*	*16*	*30.8*	*32*	*26.0*	*264*	*3.72*	*177*	*3.40*	*441*	*3.58*	*104*	*1.46*	*71*	*1.35*	*175*	*1.42*	*71*	*52*	*123*
5.	3	18.7	5	41.6	8	28.6	57	3.56	40	3.33	97	3.46	37	2.31	15	1.25	52	1.86	16	12	28
5.5	2	28.6	1	20.0	3	25.0	32	4.57	10	2.00	42	3.50	15	2.14	6	1.20	21	1.75	7	5	12
Total 5 & 5.5	*5*	*21.7*	*6*	*35.3*	*11*	*27.5*	*89*	*3.87*	*50*	*2.94*	*139*	*3.48*	*52*	*2.26*	*21*	*1.24*	*73*	*1.83*	*23*	*17*	*40*

TABLE XVIII

CORRELATION OF AGE WITH NUMBER OF CHILDREN DEPRIVED OF ONE OR BOTH PARENTS, AND WITH NUMBER OF SISTERS AND BROTHERS DEAD

Age in Years	CHILDREN DEPRIVED OF PARENTS						SISTERS AND BROTHERS DEAD						Total Number of Boys	Total Number of Girls	Total, Boys and Girls
	Number of Boys	Percentage	Number of Girls	Percentage	Boys and Girls	Percentage	Sisters and Brothers of Boys	Average No. per Boy	Sisters and Brothers of Girls	Average No. per Girl	Sisters and Brothers of both Boys and Girls	Average No. per Child			
9	0	0.0	2	40.0	2	22.2	1	.25	6	1.20	7	.78	4	5	9
10	10	25.0	5	27.7	15	25.9	45	1.13	19	1.06	64	1.10	40	18	58
9 & 10	*10*	*22.7*	*7*	*30.3*	*17*	*25.4*	*46*	*1.05*	*25*	*1.09*	*71*	*1.06*	*44*	*23*	*67*
11	11	16.4	13	21.0	24	18.6	74	1.10	59	.95	133	1.03	67	62	129
12	25	24.8	12	16.0	37	21.0	139	1.38	110	1.47	249	1.41	101	75	176
11 & 12	*36*	*21.4*	*25*	*18.2*	*61*	*20.0*	*213*	*1.27*	*169*	*1.23*	*382*	*1.25*	*168*	*137*	*305*
13	36	30.5	26	24.8	62	27.8	153	1.30	137	1.30	290	1.30	118	105	223
14	28	25.0	20	22.0	48	23.6	122	1.09	103	1.13	225	1.11	112	91	203
13 & 14	*64*	*26.7*	*46*	*23.5*	*110*	*25.8*	*275*	*1.15*	*240*	*1.22*	*515*	*1.21*	*240*	*196*	*426*
15	15	28.3	15	28.7	30	28.8	64	1.21	77	1.51	*141*	1.36	53	51	104
16	2	7.4	10	26.3	12	18.5	25	.93	24	63	49	.75	27	38	65
15 & 16	*17*	*21.5*	*25*	*25.8*	*42*	*24.9*	*89*	*1.11*	*101*	*1.12*	*190*	*1.12*	*80*	*89*	*169*
17	0	0	3	16.7	3	11.5	6	.75	21	1.17	27	1.04	8	18	26
18	0	0	1	25.0	1	14.3	6	2.00	9	2.25	15	2.14	3	4	7
17 & 18	*0*	*0*	*4*	*18.1*	*4*	*12.1*	*12*	*1.09*	*30*	*1.36*	*42*	*1.27*	*11*	*22*	*33*

TABLE XIX

Correlation of Races with Average Amount of Retardation

	Boys																Girls															Boys and Girls		
	Retardation by Half Years													Total Retardation	Number of Boys	Average Retardation	Retardation by Half Years												Total Retardation	Number of Girls	Average Retardation	Total Retardation	Total, Boys and Girls	Average Retardation
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7				1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	7.5						
Negro........	8	6	9	15	5	5	8	4	5					180.0	65	2.78	1	1	13	3	7	7	5	4	4	1	1		151.0	47	3.22	331.0	112	2.96
Mixed	1	1	4	9	5	6	4		2	1				100.5	33	3.05	3	2	3	14	9	6	1	2					108.0	40	2.70	208.5	73	2.86
German	4	3	9	13	9	7	2	1	1	1				133.5	50	2.67		5	8	4	6	2	2	1					71.0	28	2.53	204.5	78	2.62
Italian	1	1	1	5	7	1	2	3	2					73 0	23	3.18			1	4	5		2	2	2				50.0	16	3 12	123.0	39	3.15
English	2	3	2	5	1	3								36.5	16	2.28			1	3		1							13.0	5	2 60	49.5	21	2.36
Other Foreign	1	3	2	7	4	2	5				1			72.0	25	2.88		1	4	8	5							1	52.0	19	2.72	124.0	44	2.82
Total Non-Am.	17	17	27	54	31	24	21	8	10	2	1			595.5	212	2.81	4	9	30	36	32	16	10	9	6	1	1	1	449.0	155	2.89	1044.5	367	2.84
American	21	26	34	78	60	50	31	11	6	2		1	1	906.0	321	2.82	11	24	55	71	72	38	22	11	6	1	1		862.5	312	2.73	1768.5	633	2.79

TABLE XX

Distribution of Retarded Children Among the Several Grades According to Age*

Grade	Boys											Girls											Boys and Girls										
	Age in Years										Total	Age in Years										Total	Age in Years										Total
	9	10	11	12	13	14	15	16	17	18		9	10	11	12	13	14	15	16	17	18		9	10	11	12	13	14	15	16	17	18	
1	4	8	4	5	1	1					23	4	5	3	2							14	8	13	7	7	1	1					37
2	19	32	20	16	10						97	7	20	10	10	5			1			53	26	52	30	26	15			1			150
3	1	12	29	38	21	7					108		17	41	32	18	3					111	1	29	70	70	39	10					219
4		3	12	44	50	19	7				135			12	38	41	16	4	1			112		3	24	82	91	35	11	1			247
5			2	11	43	35	9	2	1		103				4	46	25	9	1	1		86			2	15	89	60	18	3	2		189
6					13	18	5	1			37					5	19	20	4	1		49					18	37	25	5	1		86
7						5	10	5	2	1	23						1	14	9	2		26						6	24	14	4	1	49
8							2	3	1	1	7							1	6	7	2	16							3	9	8	3	23
Totals	24	55	67	114	138	85	33	11	4	2	533	11	42	66	86	115	64	48	22	11	2	467	35	97	133	200	253	149	81	33	15	4	1000

*Children in ninth year counted as nine years old; in tenth, as ten years, and so on.

TABLE XXI

CORRELATION OF AGE (AT NEAREST BIRTHDAY) WITH AVERAGE RETARDATION

AGE IN YEARS	BOYS															GIRLS														Total Boys and Girls	Average Retardation
	Amount of Retardation													No. of Boys	Average Retardation	Amount of Retardation												No. of Girls	Average Retardation		
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7			1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	7.5				
9	2	1	1											4	1.4	2	1	1	1									5	1.6	9	1.5
10	16	9	8	5	1	1								40	1.6	3	4	7	4									18	1.8	58	1.7
11	7	11	6	23	13	7								67	2.3	4	12	22	14	8	2							62	2.1	129	2.2
12	7	5	18	34	12	11	9	2	3					101	2.7	3	5	17	21	17	6	5	1					75	2.7	176	2.7
13	4	7	21	24	24	16	14	3	4	1				118	2.9	2	5	15	21	30	16	6	6	3	1			105	2.9	223	2.9
14	2	7	4	24	26	21	15	8	2	2	1			112	3.2		3	14	25	22	13	6	7	1				91	2.9	203	3.0
15		2	2	11	9	12	8	4	3	1			1	53	3.4		3	5	8	11	4	12	3	4	1			51	3.3	104	3.4
16		1	1	9	6	2	4	1	3					27	3.2			4	7	10	8	2	2	3			1	38	3.2	65	3.2
17				2		3	1	1	1					8	3.6				6	5	2	1	1	1		2		18	3.4	26	3.5
18						1	1					1		3	4.7					1	3							4	3.4	7	3.9

TABLE XXII

CORRELATION OF GRADE WITH AVERAGE RETARDATION

GRADE	BOYS			GIRLS			BOYS AND GIRLS		
	Total Retardation	Number of Boys	Average Retardation	Total Retardation	Number of Girls	Average Retardation	Total Retardation	Total, Boys and Girls	Average Retardation
1	79.0	23	3.43	40.0	14	2.86	119.0	37	3.22
2	274.0	97	2.83	154.5	53	2.92	428.5	150	2.86
1 & 2	*353.0*	*120*	*2.94*	*194.5*	*67*	*2.90*	*547.5*	*187*	*2.93*
3	314.0	108	2.91	305.0	111	2.75	619.0	219	2.82
4	387.5	135	2.87	327.0	112	2.92	714.5	247	2.89
3 & 4	*701.5*	*243*	*2.88*	*632.0*	*223*	*2.83*	*1333.5*	*466*	*2.86*
5	285.5	103	2.77	237.5	86	2.76	523.0	189	2.77
6	80.5	37	2.18	131.0	49	2.67	211.5	86	2.46
5 & 6	*366.0*	*140*	*2.61*	*368.5*	*135*	*2.73*	*734.5*	*275*	*2.67*
7	59.5	23	2.58	67.0	26	2.58	126.5	49	2.58
8	18.5	7	2.64	45.0	16	2.81	63.5	23	2.76
7 & 8	*78.0*	*30*	*2.60*	*112.0*	*42*	*2.67*	*190.0*	*72*	*2.64*

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